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master plan for solid waste collection and disposal ~ tri-parish metropolitan area of
NEW ORLEANS

final report on a solid waste management demonstration

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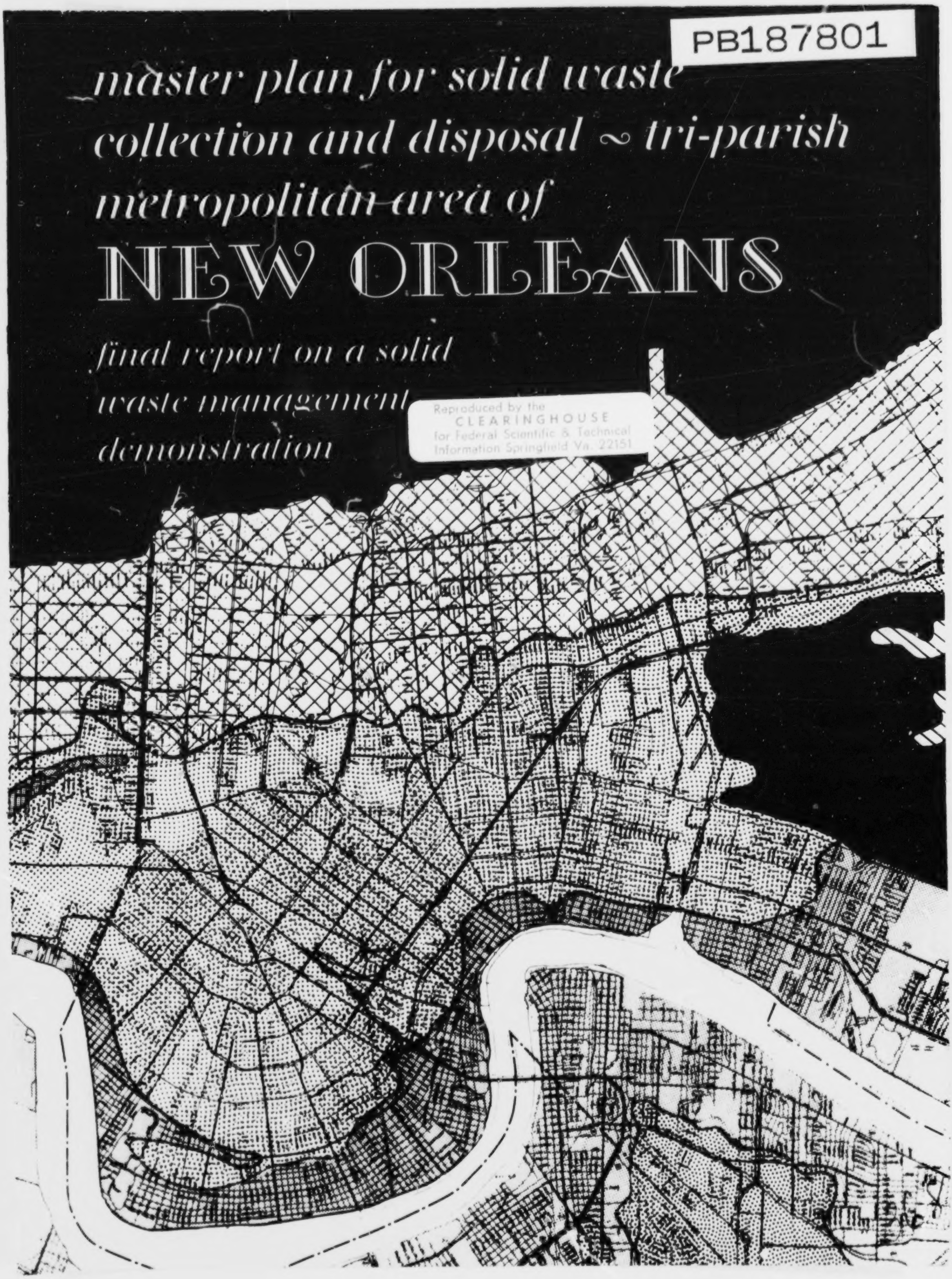

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MASTER PLAN FOR SOLID WASTE COLLECTION AND DISPOSAL
TRI-PARISH METROPOLITAN AREA OF NEW ORLEANS

Final Report on a Solid Waste Management Demonstration

This report (SW-4d) was prepared by
Albert Switzer & Associates, Inc., and Greenleaf/Telesca,
for the City of New Orleans under Grant No. D01-UI-00063.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
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FOREWORD

An estimated 900 million pounds of wastes in the solid state are produced in the United States every day. What to do with these solid wastes, how to dispose of them without needlessly endangering public health and welfare, and how to recover and reuse valuable materials now "thrown away" are among the most challenging and perplexing of current national problems. Because of lack of suitable planning, interest, and public understanding, these problems have reached such proportions that nationwide attention is demanded and action for the development of adequate solutions must be taken.

Intensified action concerning these problems was made possible by the Solid Waste Disposal Act, Title II of Public Law 89-272, which was signed by the President on October 20, 1965. This legislation directs the Secretary of the Department of Health, Education, and Welfare to initiate, encourage, and support a national program aimed at discovering and evaluating better methods of coping with the solid waste problem.

The Secretary is authorized (1) to conduct and support research on the nature and scope of the problem, on methods of more safely and efficiently collecting and disposing of solid wastes, and on techniques for recovering from solid wastes potentially valuable materials and energy; (2) to provide training and financial and technical assistance to local and State agencies and other organizations in the planning, development, and conduct of solid waste management programs; (3) to encourage and support projects that may demonstrate new and improved methods of solid waste collection, handling, and disposal. The Bureau of Solid Waste Management carries out these responsibilities.

Among these responsibilities, the Bureau provides grant support for demonstrations relating to the development and application of new and improved methods of solid waste collection, storage, processing, and ultimate disposal; and grants for studies and investigations that may lead to a demonstration of improved disposal practices, or may provide solutions for regional or national solid waste disposal problems. Associated with this is the responsibility for collecting and making available by appropriate means the results of, and other information pertaining to, such federally supported demonstrations, studies and investigations.

Accordingly this report has been reproduced to disseminate as widely as possible the latest available information and findings of a project that has received grant support from the Bureau of Solid Waste Management. It is hoped that it will provide those working in this field with useful information that will be of assistance in developing approaches to the solutions of their solid waste disposal problems.

-- RICHARD D. VAUGHAN, *Director*

Bureau of Solid Waste Management

PREFACE

This report was prepared by the consulting firms of Albert Switzer & Associates, Inc., and Greenleaf/Telesca, Engineers & Architects, for the City of New Orleans. It results from studies and investigations carried out by the two firms for the purpose of analyzing existing solid waste collection and disposal facilities in the New Orleans Metropolitan Area, and for developing a master plan for an integrated collection and disposal system. A solution to the refuse problem is proposed in two stages, covering periods from the present to 1980, and from 1980 to 1990. The study was supported, in part, by demonstration grant D01-UI-00063, made to the City by the Bureau of Solid Waste Management under provisions of the Solid Waste Disposal Act (PL 89-272).

We trust that this report well illustrates the method of developing a solid waste management plan for a major metropolitan area and the elements that should be included in such a plan. It should be useful to others who may be considering a similar study.

It may be noted (see page VI-I of report) that a separate study of a portion of the New Orleans Metropolitan Area was conducted by the consulting engineering firm of Pepper & Associates. This latter study, partially supported by demonstration grant D01-UI-00019, has been completed. The final report is being reviewed by the Bureau of Solid Waste Management, and will also be made available for widespread distribution by the Bureau.

--ANTON J. MUHICH, *Director*

Division of Demonstration Operations

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From St. Bernard Parish: Mr. Valentine Riess, President of the Police Jury; Mr. Angelo Chetta, Director-Secretary of the Planning Commission, and Earl P. Deselle & Associates, Consulting Engineers.

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CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

In the following we have summarized the findings and conclusions resulting from the detailed studies contained in this Report. These have been grouped into those which apply to the Tri-Parish area as a whole or where inter parish cooperation is considered, and into those which apply to a single parish each of which has been treated separately.

A. TRI-PARISH AREA

1. Existing landfills, municipal as well as private, are not operated in accordance with accepted health standards due principally to: a) filling in areas where leachates can contaminate streams and bayous, b) lack of suitable cover material in the area, and c) the practice of burning refuse at the site.

2. Existing landfills should be converted to sanitary landfills by diking and draining and by providing adequate and suitable cover material so as to stop air and water pollution and eliminate possible health hazards. (See Appendix for suggested regulations).

3. In order to immediately prohibit further open dumping or burning of combustible materials, sanitary landfills should be established and operated for the disposal of all putrescible and combustible refuse in excess of the capabilities of the incinerators until such time as sufficient incinerator capacity can be provided.

4. Enforcement of regulations concerning collection and disposal of solid waste is lax due largely to insufficient funding and manpower assigned for this purpose.

5. The need for diking and draining the site, for purchasing suitable cover material and for limiting the depth of fill, each adds to the cost of sanitary landfill operation in the area, making this method of disposal less competitive than is frequently the case. (Page IV-24 to IV-30).

6. Incineration was found to be the most practical and economical method of satisfactory refuse disposal to meet both present and future needs, based upon a study of methods considered for the area. (Page IV-23 to IV-31).

7. An incineration program to cover the requirements of the Tri-Parish area for

the next twenty years will increase considerably the reliability of the entire waste collection and disposal system.

8. Cooperation in the joint usage of facilities between the parishes in the Tri-Parish area will result in a more effective and economical refuse disposal system, and could save as much as 10-15% in overall disposal costs. (Page VII-10 to VII-12).

9. The communities should formulate and adopt common standards, preferably under the administration of a single Authority, for the control and regulation of the disposal of waste. These standards in the form of a master ordinance should incorporate by reference the recommended specifications for disposal of all types of solid wastes by methods that are acceptable to local, state and federal authorities. (Page III-18 to III-19).

10. This Authority should establish policy, administer, control, and enforce the adopted regulations. Such regulations should specifically prohibit open dumping and open burning of all wastes that would present environmental hazards or any means of disposal that would contribute undesirable pollution levels to the air, water, or land. (Page III-18 to III-19).

11. Control of all refuse disposal facilities under a single authority would provide the maximum reliability and flexibility of operation at the lowest possible operating cost. This would probably result in an annual savings of 5-10%. (Page VII-10 to VII-12).

12. Orleans and St. Bernard Parishes should consider the use of a joint disposal facility before 1980 to handle refuse in excess of the capacities of the enlarged Florida Avenue and the New St. Bernard Incinerators. (Page VII-6 to VII-7).

13. Orleans and Jefferson Parishes and the City of Gretna should consider the joint use of the Algiers Incinerator for the disposal of refuse generated in the area. (Page VII-4).

14. Combustible refuse production in the area will amount to 3,675 tons/day in 1980 and is expected to reach 5,700 by 1990. (Page VII-1).

15. The proposed disposal program by incineration will require an estimated capital investment of $19,100,000 by 1980 and an additional capital investment of $17,100,000 in the continuing period to 1990, based on 1967 costs. (Page VII-7 to VII-9).

16. An effective annual incineration capacity of 1,400,000 tons will be available under the proposed program by 1980 and will be expanded to slightly over a 1,800,000 ton capacity by 1990. (Page VII-8).

17. Operating at full effective capacity, estimated annual costs of these incinerator facilities are expected to be about $4,500,000 by 1980 and $6,400,000 by 1990 based on 1967 costs.

B. ORLEANS PARISH

1. The total production of waste in Orleans Parish at present, amount to 1,950 tons per day and includes 1,285 tons of combustible refuse of which 55% is collected by the City and the remainder by private disposal companies and individual business firms. This represents a per capita production of 5.69 lbs. per day total and 3.96 lbs. per day of combustible refuse. (Page V-48 to V-50).

2. The per capita production of combustible refuse in Orleans Parish is expected to increase to 4.31 lbs/day by 1980 and 5.08 lbs/day by 1990, thus requiring incinerator capacities of 2,200 tons/day and 2,900 respectively. (Page V-108).

3. Regulations covering solid waste handling and disposal are reasonably adequate except for establishing firm air pollution control limits and specific operating criteria for sanitary landfills and other methods of disposal.

4. The total capacity of existing incinerators in Orleans Parish, including the St. Louis plant which is presently out of service, is not sufficient to handle all combustible refuse presently produced in the City.

5. Neither the Florida Avenue nor the Seventh Street plants can meet anticipated air pollution standards without major reconstruction of the furnaces and appurtenances.

6. The existing incinerators in Orleans Parish are excellently located with respect to their service areas so that the additional incinerator capacity required at present should be provided at those sites.

7. The St. Louis plant must be rehabilitated and returned to service, as an early step of any improvement program. Included in the rehabilitation should be

the installation of wells and pumps to supply the 120 million gal. per year estimated water requirements of the plant under full operation.

8. The First Stage Development Program should provide sufficient incinerator capacity for at least a 10-year period. This will require a total of 2,200 tons per day (6-day week) to meet the needs of the City (1980). (Page V-108).

9. The additional capacity required should be provided by increasing the combined capacity of the Florida Avenue and the Seventh Street Incinerators to 1,500 tons per day. (Page V-108 to V-110).

10. Substantial savings in operating cost will be realized by enlargement of the two existing plants, over the operating cost of reconstructing these plants to their present size and providing the additional capacity required by a new incinerator at another site.

11. The Florida Avenue Incinerator can be modified and enlarged utilizing a portion of the existing facilities. Such enlargement should provide for a total of 600-ton per day capacity utilizing two 300-ton per day furnaces.

12. The Florida Avenue Incinerator should be rebuilt first under the development program since removing the present plant from operation will cause a minimum interference with refuse disposal operations. Its construction should be started in 1969 so as to place it in operation by 1971.

13. Additional incinerator capacity required by 1973 should be provided by enlarging the Seventh Street plant to a rated capacity of 900 tons per day utilizing three 300-ton furnaces.

14. The quality of the residue at the Algiers Incinerator can be improved by increasing the capacity of the forced draft fan and the downtime and operating cost can be substantially reduced by modifying the residue conveyor as outlined in this report. Also, this plant should be provided with its own wells and pumps to supply the estimated 50 million gal. per year required for its operation.

15. Treatment of the waste water from both, St. Louis and Algiers Incinerators will remove settleable matter before discharge into storm or sanitary sewers and will permit its reuse to the extent practicable.

16. Once the St. Louis Incinerator has been placed in regular operation, the

collection districts and truck routes should, subject to field verification, be modified as recommended herein. Such modification will result in the reduction in the present number of truck routes at an annual savings of $23,000 per year, per route without increasing the present work day.

17. Calculations based on our survey show a possible reduction in the number of routes from the present 111 to 101 which number will increase in 1970 to 108 and by 1980 to 139 due to the growth anticipated in the area. (Page V-63 to V-80).

18. After the additional incinerator capacities have been provided, further modification of the collection districts as outlined in this report will result in an annual savings of approximately $50,000 by the elimination of two additional truck routes.

19. The anticipated growth within the service area of the Algiers Incinerator in Orleans Parish requires that this facility be enlarged prior to 1975.

20. The addition of a 300-ton furnace by 1975 with a second similar furnace before 1990 is required if the Algiers Incinerator is to serve as a joint facility for the City of Gretna and part of Jefferson Parish in addition to its present service area.

21. The N. O. East Incinerator will reach its full capacity by 1980 when additional disposal facilities will be required. Interim use of the St. Bernard facilities until 1987 should be considered, after which a site for a sanitary landfill containing 50 to 100 acres should be prepared with dikes and drainage in the Blind Lagoon Park area and utilized as a sanitary landfill. The sanitary landfill should be operated until such time as the growth in refuse production justifies the construction of an additional incinerator. Such incinerator should have an initial capacity of 400 tons per day with provisions for expansion to 600 tons.

C. JEFFERSON PARISH

1. The present Gretna and Marrero Incinerators are of an obsolete type, expensive to operate and cannot meet anticipated air pollution standards and, therefore, should be retired from service.

2. The Marrero Incinerator is well located in its service area and should be

replaced by a modern incinerator with an initial capacity of 500 tons per day. This incinerator will require enlargement to 750 tons per day prior to 1990.

3. The Algiers and Marrero Incinerators with proposed enlargements through 1990 can adequately serve the entire Westbank development in both Orleans and Jefferson Parishes.

4. Two new incinerators, in addition to the present David Drive Incinerator, will be required to serve the Eastbank of Jefferson Parish prior to 1980. One to be located near the Kenner city limits, having an initial capacity of 400 tons per day with provision for expansion to 600 tons prior to 1990. The second, to be located near Labarre Road and Airline Highway having an initial capacity of 600 tons per day with provision for expansion to 900 tons prior to 1990.

D ST. BERNARD PARISH

1. A new 400-ton per day incinerator will be required before 1980 to dispose of combustible waste generated within the Parish and that produced within the adjacent area of Orleans Parish. This incinerator will require enlargement to 600 tons per day prior to 1990.

2. Continued operation of the present 100-ton per day incinerator would not be economically feasible and should be discontinued once the new plant is completed.

RECOMMENDATIONS

In the following recommendations, those applying to more than one parish or to the Tri-Parish area as a whole have been placed in a group, and those applying to a single parish have been so separated.

A. TRI-PARISH AREA

1. Convert present landfills receiving putrescible and combustible refuse to sanitary landfills by diking, draining, and adequately covering the refuse daily with suitable material and adopt ordinances to regulate these operations (see Appendix V, Suggested Regulations for Sanitary Landfill).
2. Limit use of landfills not converted to sanitary landfills to receiving only non-combustible refuse which will not contaminate waters leaching or draining from the fill.
3. Prohibit further open dumping or burning.
4. Enforce regulations concerning collection and disposal of solid wastes and assign sufficient personnel for this purpose.
5. Dispose of all combustible waste generated in area by incineration in modern incinerators with adequate air pollution control.
6. Adopt air pollution control limits conforming to the Los Angeles County requirements, namely:

   An allowance of not more than 0.3 grains per standard cubic foot of flue gas corrected to 12 percent CO_2.
7. Select incinerator service areas that will produce at least 600 tons of refuse per day within a reasonable period in order to insure minimum disposal costs through economical incinerator operation and haul costs.
8. Undertake, through an agency such as the Regional Planning Commission, to sponsor an Authority which will formulate standards and encourage adoption and implementation of such standards by each community as rapidly as possible with an agreement upon deadline for compliance by not later than 1980.

9. Arrangements be made by Orleans and St. Bernard for the joint disposal of refuse in excess of the capacities of the enlarged Florida Avenue and St. Bernard Incinerators.

10. Arrangements be made by Orleans and Jefferson Parishes and the City of Gretna for the joint disposal of refuse generated in the area at the Algiers Incinerator.

B. ORLEANS PARISH

1. Correct deficiencies of the St. Louis Incinerator including the addition of wells and pumps for its water supply requirements and place this plant in regular service as soon as possible.

2. Modify the fans, residue conveyor, and provide wells and pumps for water requirements at the Algiers Incinerator to improve its operation and reduce its cost. Also, repair cyclones and ductwork to extent required to permit proper operation.

3. Conduct stack emission tests at the Algiers, St. Louis, and New Orleans East Incinerators once these plants are in regular operation to determine emission rates and verify design criteria for new plants.

4. Authorize design for the modernization, reconstruction, and enlargement of the Florida Avenue Incinerator, so that construction may be started by 1969, after the St. Louis plant is in service, and initiate immediately the steps necessary for financing its construction so that it may be placed in service by 1971.

5. Plan the reconstruction and enlargement of the Seventh Street Incinerator to 900 tons per day capacity so that it will be placed in service by 1973 and the expansion of the Algiers Incinerator by 1975.

6. Modify the collection districts and truck routes as outlined in this report once the five incinerators are in operation.

C. JEFFERSON PARISH

1. Replace the existing Marrero Incinerator with a new 500-ton incinerator which can be enlarged to 750 tons per day.

2. Construct a new incinerator before 1980 to serve the City of Kenner and the surrounding unincorporated area. Incinerator to have an initial capacity of 400 tons and an ultimate capacity of 600 tons per day.

3. Construct a new incinerator before 1980 to serve the easterly part of the unincorporated area on the Eastbank. Incinerator to have an initial capacity of 600 tons and an ultimate capacity of 900 tons per day.

D. ST. BERNARD PARISH

1. Construct an incinerator to provide for the needs of the Parish and to serve the adjoining area of Orleans Parish. Incinerator to have an ultimate capacity of 600 tons per day with 400 tons being provided initially.

2. Retire present incinerator from operation when larger plant is placed in service.

3. Supplement present incinerator with sanitary landfill until refuse quantities can justify incinerator construction.

I BRIEF HISTORY AND DESCRIPTION OF THE METROPOLITAN AREA

For purposes of this study the metropolitan New Orleans area is defined as the existing contiguous developed area of Orleans, Jefferson, and St. Bernard Parishes and that area expected to develop within the next two decades.

Accounts of the historic development of the metropolitan area are generally centered around that of the City of New Orleans. New Orleans was founded by Jean Baptiste le Moyne, sieur de Bienville and was named in honor of Duc d'Orleans, Regent of France. The founding date (contested by historians) has been established legally by the Mayor and City Council as April 16, 1718. New Orleans has flown under various flags and has been considered one of the principal cities and/or ports during its 250 years history. Having been established as a French colony in 1718, New Orleans remained a French possession until it was given to Charles III of Spain by his cousin, Louis XV, in 1762. Spanish rule extended to 1803 when it was transferred back to France and later was purchased by the United States in the same year. As a result of the Louisiana Purchase of 1803, the City became an integral and strategic part of the United States and it was capital of Louisiana during the mid 19th Century.

Orleans, the first County created after the Louisiana Purchase comprised all that portion of Louisiana lying on both sides of the Mississippi River from the mouth of the River to the Parish of St. Charles. Thus, Orleans County incorporated all the territory included in the present parishes of Orleans, Jefferson, St. Bernard, and Plaquemines. The Orleans Territorial Legislature of 1807 revoked the establishment of the original 12 counties and created instead nineteen parishes. Two of these new parishes, St. Bernard and Plaquemines, were taken from Orleans. All of the remaining territory of Orleans County became Orleans Parish. Jefferson Parish was created in 1825 by its removal from Orleans Parish which extended from Felicity Street to St. Charles Parish and Lake Pontchartrain on the Westbank of the Mississippi River, and on the Eastbank from the river to the Gulf of Mexico. Annexation of Lafayette (1833), Jefferson City (1890), and Carrollton (1874) by rapidly growing New Orleans have altered the original parish boundaries. Jefferson's Eastbank comprises an unincorporated area and the incorporated areas of Kenner (1873) located 12 miles above New Orleans and Harahan (1920) two miles below Kenner. Metairie, a large unincorporated community is located west of and adjacent to New Orleans. The Westbank comprises an unincorporated area and the incorporated areas of Gretna (1916), the Parish Seat, (adjacent to the New Orleans community of Algiers) and Westwego (1919), located above Gretna.

This metropolitan community as illustrated in Figure I-1 (backcover) is located in southeastern Louisiana, situated on Lake Pontchartrain to the north and is divided by the meandering Mississippi River. It is situated approximately 85 miles north of the mouth of the

Mississippi and 76 miles southeast of Baton Rouge. Variable routes of access to the Gulf of Mexico exist via the Mississippi River, Lake Pontchartrain, the recently completed Mississippi River Gulf Outlet, and the Intracoastal Waterway, all of which are interconnected by the Inner Harbor Navigation Canal.

The Governmental structure of the area is unique. Orleans Parish, being coextensive with the City of New Orleans, has a Mayor-City Council (7) form of government. A President and Police Jury govern St. Bernard Parish. Jefferson's unincorporated area has a Parish President - Council. The incorporated cities of Kenner, Harahan, Gretna, and Westwego have Mayor - Aldermen forms of government.

New Orleans' strategic location on the Mississippi River provided the setting for its inevitable major role in various historical conflicts, including the War of 1812, Civil War, World War I, and World War II. Great strides in commercial and industrial expansion from the late 19th Century to the present time may largely be attributed to this strategic location.

The Central Business District of this metropolis is characterized by a major and growing complex of high rise structures, including retail stores, hotels, apartments, a hospital, private and governmental offices and multi-level parking garages.

The port is one of the principal business and trade centers on serving the midwest and Latin America. Its location and accessibility have gained for New Orleans the rank of 2nd largest port (in value of foreign commerce) in the United States.

The Country's second Foreign Trade Zone is located in New Orleans. Within this zone, products from foreign countries may be stored indefinitely, examined, rehandled, assorted, graded, combined, relabeled, processed, and packaged. Duties are paid only if products enter into domestic commerce. Wharfare, cargo handling, and associated port fees are nominal. With ownership vested in the State of Louisiana, the operations are governed by an appointed commission. The port includes harbor frontage in Orleans, Jefferson, St. Bernard, and Plaquemines Parishes, totaling approximately 51.4 miles on both banks of the River, 11 miles along the Inner Harbor Navigation Canal and nearly unlimited frontage available for development along the Mississippi River-Gulf Outlet Channel. Catering to both domestic and international trade has encouraged numerous firms, foreign representatives, and transportation lines to locate in New Orleans. Such representation has led to the development of International Trade Mart and Rivergate Exhibition Hall. It is the primary purpose of the International Trade Mart to provide office facilities to firms and organizations which are directly connected or interested in foreign trade and business of the port. Upon completion of Rivergate Exhibition Hall in 1968, New Orleans will be able to accommodate the larger conventions and exhibitions. The International Center Complex is located centrally within the metropolitan port area.

Extremely low ground is characteristic of the area. Topographic characteristics necessitate a system of flood control levees through the metropolitan area. The extreme low elevations in the New Orleans area range to five feet below mean gulf levels in some locations. In addition to the disadvantage of topography, low elevations, and poor natural drainage, the area receives annual rainfall in excess of 60 inches, which further necessitates the elaborate system of drainage canals and pumping stations.

The area has a semi-tropical climate, with high humidity, yet the mean temperature for southeastern Louisiana is only 69.5°F. The climate is affected by prevailing southerly winds and the influence of the surrounding water masses. Freezing weather is seldom experienced. Mean summer highs can be expected to range in the 90's. This "hot-house" type of climate makes a growing season possible 330 to 350 days a year. Monthly climatic conditions are presented in Table I-1.

TABLE I-1
CLIMATIC CONDITIONS OF THE METROPOLITAN NEW ORLEANS AREA

	JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	ANNUAL
Normal Mo. Avg. Temp.	55.5	57.7	62.1	68.9	75.7	81.1	82.6	82.5	78.9	71.1	61.0	56.6	69.5
Normal Mo. Max. Temp.	64.8	67.3	71.7	78.4	85.3	90.3	91.4	91.6	88.1	81.4	71.3	65.9	79.0
Normal Mo. Min. Temp.	46.2	48.0	52.4	59.4	66.0	71.9	73.7	73.4	69.7	60.7	50.6	47.2	59.9
Highest Temp. on Record	83	85	90	91	97	102	100	100	99	93	89	84	102
Lowest Temp. on Record	17	20	28	41	50	62	66	65	54	40	31	19	17
Normal Monthly Precip.	4.4"	4.7"	6.2"	5.4"	5.1"	5.5"	7.9"	6.3"	6.0"	3.2"	3.7"	4.9"	63.3"
Avg. No. Days with Precip.	10	9	9	7	9	12	15	14	10	7	7	10	119
Avg. % Possible Sunshine	49%	51%	57%	65%	69%	67%	61%	64%	65%	72%	62%	48%	61%
Avg. Wind Speed - MPH	7.5	7.6	7.8	7.5	6.7	5.9	5.6	5.6	6.7	6.9	7.2	7.3	6.9
Avg. Relative Humidity-%	85-67	85-64	83-60	84-59	83-59	83-60	84-63	85-63	85-62	82-59	82-60	85-66	84-62

SOURCE: Statistical Abstract of the U. S., 1964

As recently indicated by planning studies conducted by Larry Smith and Company, Inc., a dual economy actually exists in New Orleans, being largely dependent on the industries of tourism and port activities. The overall economy of the metropolitan area incorporates extensive agricultural enterprises, exploiting the fertile alluvial soil in the outlying areas of the delta region and producing rice, sugarcane, cotton, corn, fruit, and vegetables. Animal husbandry, trapping, and commercial fishing, together with agricultural production and importation of foreign and domestic products have led to manufacturing and industrial activities, such as food processing and packaging, granaries, sugar refineries, rice milling, coffee processing, furs, and textiles. The abundance of natural resources of the region such as timber, salt, sulphur, natural gas, and oil, have also led to major industrial development, including the petro-checmial plants, ship building, aluminum production and petroleum refineries.

Supplementing agriculture and its natural resources, as vital factors in the area's industrial growth, are the natural advantages of the port with its easy accessibility to inland and coastal ports via various routes; the unlimited and inexpensive fuel supply of natural gas and the ample supply of fresh water which is taken directly from the River. To attract and encourage large corporations to settle within the State and metropolitan area, the Louisiana State Legislature has granted a ten-year property tax exemption.

Area industry is served by 8-trunk railroads, 100 steamship lines, 70 barge lines, 60 motor freight lines, and the Public Belt Railroad with 175 miles of trackage which connects the various terminals and facilities of all carriers on a common circuit and interchange. The highway network serving the metropolitan area provides principal east-west access via Interstate 10 (under construction) and U. S. 90. Principal northerly routes include U. S. 11, Lake Pontchartrain Causeway, and U. S. 61. The traffic network within the metropolitan area is severely congested today at peak load hours. Highway access between the Eastbank and Westbank communities is limited to two bridges spanning the River; (1) the Huey Long Bridge to the west and (2) the Mississippi River Bridge centrally located in the metropolitan area. Several ferry routes at intermediate points supplement these crossings. Various expressway system modifications, including additional bridge crossings, are anticipated to relieve this congestion in the coming years. The area is also served by three airports: The New Orleans Airport on Lake Pontchartrain for private planes; the Moisant International Airport for commercial traffic; and Callender Field for military aircraft.

The metropolis offers many cultural and recreational attractions to its citizens and visitors. Various theatrical, musical, and operatic productions are sponsored and produced by municipal, university, and private organizations throughout the year. The Municipal Auditorium, Civic Theater, Gallery Theater, and Le Petite Theater de Vieux Carre are among the many facilities housing these productions. The proposed Cultural Center Complex, to be located centrally in New Orleans, will soon be added to these facilities. The cultural heritage of the area is being preserved by such civic-minded groups as the Folklore Society, the Louisiana Historical Association, and Vieux Carre Commission. Local museums, including Isaac Delgado Museum of Art, Louisiana State Museum, Confederate Museum, and Tulane Medical Museum also relate the area's heritage. Complimenting the cultural advantages of the metropolis are its 380 public and private schools, colleges, universities, business colleges, and vocational trade schools. Within the area there are two major medical schools and 21 hospitals, including general, special, industrial, army, and public health hospitals.

Metropolitan New Orleans has much to offer and accommodate her thousands of tourists annually. It is noted internationally for its varied and numerous restaurants, hotels, the entertainment and historic aspects of the Vieux Carre, the Mid-Winter Sports Carnival climaxed by the Sugar Bowl Classic, and the famed Mardi Gras season. Spectator sports have been dominant in the past in New Orleans and recent interest in the professional sports field through local franchises of National Football League and American Basketball Association teams have been the stimulant for the promotion of the proposed fifty to eighty thousand seat domed stadium to be centrally located in the City of New Orleans.

II METROPOLITAN POPULATION

A. General

Tri-parish population data used in this report has been taken from the U. S. Bureau of Census 1900 to 1960, and studies undertaken by local planning agencies. Planning forecasts of population growth have been based upon detailed studies of the various trends and influences affecting the respective areas.

The historic change in population of the various parishes from 1900 to 1960 indicates the great growth and urbanization trend of the 20th Century. At the turn of the century, 93.5% of the Tri-parish population was located in Orleans Parish, 5.0% in Jefferson and 1.5% in St. Bernard. A gradual change in this percentage distribution started during the 1920-30 decade. Table II-1 illustrates the population ratio changes of Orleans, Jefferson, and St. Bernard Parishes at each decade from 1900 to the last census year, 1960.

TABLE II-1
TRI-PARISH POPULATION DISTRIBUTION 1900-1960

Year	Total Tri-Parish Population	% Distribution		
		Orleans	Jefferson	St. Bernard
1900	307,456	93.5	5.0	1.5
1910	362,599	93.5	5.0	1.5
1920	413,750	93.6	5.2	1.2
1930	503,306	90.7	8.0	1.3
1940	552,244	89.6	9.1	1.3
1950	685,405	83.3	15.1	1.6
1960	868,480	72.4	24.1	3.5

able II-2 further details this population distribution by communities of the Tri-arish area during this same period and their individual growth rates during each decade.

TABLE II-2
METROPOLITAN POPULATION 1900-1960

	1900		1910		1920		1930		1940		1950		1960	
	Pop.	* %	Pop.	* %	Pop.	* %	Pop.	* %	Pop.	* %	Pop.	* %	Pop.	* %
Jefferson Parish														
(Eastbank)														
Unincorporated Area	4,289		4,320	.7	4,352	.7	10,065	131.3	15,375	52.8	45,068	193.1	106,638	136.0
City of Kenner					1,882		2,440	29.6	2,375	-2.7	5,535	133.1	17,037	207.8
City of Harahan							892		1,082	21.3	3,394	213.7	9,275	173.3
TOTAL Eastbank	4,289		4,320	.7	6,234	44.3	13,397	114.9	18,832	40.6	53,997	186.7	132,950	146.2
(Westbank)														
Unincorporated Area	11,032		13,927	26.2	8,132	-41.6	13,064	60.6	15,724	20.4	27,735	76.4	44,037	58.8
City of Gretna					7,197		9,584	33.2	10,879	13.5	13,813	27.0	21,967	59.0
City of Westwego							3,987		4,992	25.3	8,328	66.8	9,815	17.9
TOTAL Westbank	11,032		13,927	26.2	15,329	10.1	26,635	73.8	31,595	18.6	49,876	57.9	75,819	52.0
Jefferson Parish (TOTAL)	15,321	15.9	18,247	19.1	21,563	18.2	40,032	85.7	50,427	26.0	103,873	106.0	208,769	101.0
St. Bernard Parish	5,031	16.3	5,277	4.9	4,968	-5.9	6,512	31.1	7,280	11.8	11,087	52.3	32,186	190.3
Orleans Parish	287,104	18.6	339,075	18.1	387,219	14.2	458,762	18.5	494,537	7.8	570,445	15.3	627,525	9.9
Metropolitan Area	307,456	18.4	362,599	17.9	413,750	14.1	505,306	22.1	552,244	25.7	685,405	24.1	868,480	27.3

* Percent change from previous census
Source: Bureau of U. S. Census

Table II-3 illustrates the forecast change in percentage distribution between Orleans, Jefferson, and St. Bernard from 1965 to 1990.

TABLE II-3
ESTIMATED TRI-PARISH POPULATION DISTRIBUTION 1965 - 1990

Year	Total Tri-Parish Population	% Distribution		
		Orleans	Jefferson	St. Bernard
1965	937,750	67.8	27.9	4.3
1967	1,073,570	64.0	31.7	4.3
1970	1,131,000	63.2	32.2	4.6
1975	1,297,000	58.9	36.2	4.9
1980	1,489,000	55.2	39.6	5.2
1985	1,700,000	51.5	43.2	5.3
* 1990	1,966,000	47.7	47.0	5.3

*Projection from 1985 to 1990 based on the same percent of growth as the prior 5-year period.

Table II-4 shows distribution of this population as forecast for the communities of the Tri-Parish area to the year 1990.

In 1960 the Metropolitan Area of New Orleans (SMSA, including St. Tammany Parish) ranked as the 16th largest Metropolitan Area in the United States, with a population of 907,123. The Tri-Parish area alone (excluding St. Tammany Parish) has increased greatly within the last seven years, surpassing the 1,000,000 plateau in the mid-sixties.

Three principal factors have had a continuing effect on the population increase of this area. First, the Metropolitan Area has developed as a manufacturing center of the first magnitude. There were 900 plants with average employment of 58,000 in 1966, receiving an estimated annual payroll of $293 million. From 1946 through 1966, over $1.59 billion has been invested in capital expenditures for new and expanded manufacturing facilities, making it one of the fastest growing industrial sections in the United States. Secondly, a vast complex of petro-chemical plants has developed in recent years along the Mississippi River between New Orleans and Baton Rouge. The rapid and continuing growth of the petro-chemical industry

TABLE II-4
METROPOLITAN POPULATION 1960 - 1990

	1960 U.S. Census	1965 Est.	1967 Est.	1970 Est.	1975 Est.	1980 Est.	1985 Est.	*1990 Est.
Jefferson Parish								
(Eastbank)								
Unincorporated Area	106,638	145,360	179,000	190,000	249,500	311,000	380,000	460,000
City of Kenner	17,037	23,200	35,000	43,000	50,000	72,500	97,500	120,000
City of Harahan	9,275	12,640	16,000	17,000	20,500	26,500	32,500	40,000
TOTAL Eastbank	132,950	181,200	230,000	250,000	320,000	410,000	510,000	620,000
(Westbank)								
Unincorporated Area	44,037	54,850	63,750	66,700	90,000	125,000	164,000	242,000
City of Gretna	21,967	27,500	32,000	33,400	35,500	38,000	41,000	44,000
City of Westwego	9,815	12,250	14,250	14,900	16,000	17,000	18,000	19,000
TOTAL Westbank	75,819	94,600	110,000	115,000	150,000	180,000	220,000	305,000
Jefferson Parish (TOTAL)	208,769	275,800	340,000	365,000	470,000	590,000	730,000	925,000
** St. Bernard Parish	32,186	42,300	46,380	52,500	64,000	77,000	90,000	104,000
** Orleans Parish	627,525	669,650	687,190	713,500	763,000	822,000	880,000	937,000
METROPOLITAN AREA	868,480	987,750	1,073,570	1,131,000	1,297,000	1,489,000	1,700,000	1,966,000

* Projection from 1985 to 1990 based on same percent of growth as the prior 5-year period

** City of New Orleans Planning Commission estimates (Larry Smith Consultant)

has become one of the area's major economic assets. Thirdly, NASA Michoud Assembly facility has created 23,000 job opportunities within the area. Not only have these factors affected the Metropolitan Area's population increase during the sixties, but it is anticipated that they will continue to do so in the future, together with intensified industrial growth throughout the area, supported by improved transportation systems, availability of economical fuels and an adequate labor supply.

Several forecasts of population have been made for the Tri-Parish area as well as for each of the individual parishes. The Louisiana State University (L.S.U.N.O.) through its Department of Business and Economics has made a forecast based upon a detailed study of the area. It has been suggested that this forecast will probably be adopted by the State in its future planning for the area. Larry Smith, Consultant to the New Orleans Planning Board has made a detailed forecast for Orleans Parish as well as a forecast covering the Tri-Parish area. Both Planning Services, Inc.

and the Chamber of Commerce have also prepared forecasts covering the area. These forecasts for 1985 vary from a low of 1,300,000 to a high of 2,075,000. For the purpose of our study we have adopted a figure of 1,700,000 for 1985 and have projected this to 1,966,000 for 1990. These forecasts are shown on Figure II-1. On Figure II-2 we have shown our proposed subdivision between each of the Parishes.

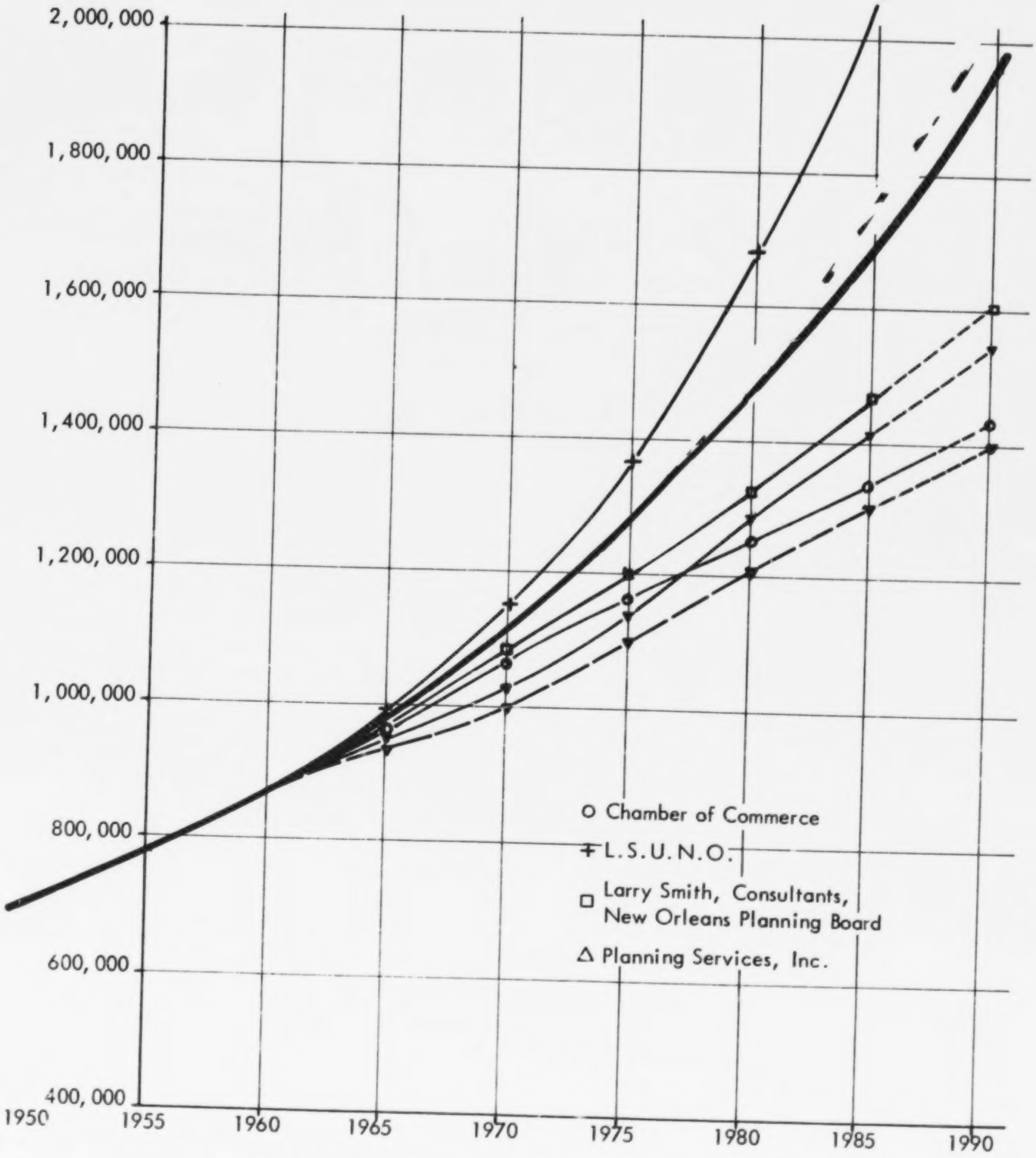
Jefferson Parish has been further subdivided between Eastbank and Westbank. In subdividing the population between the Parishes we have adopted the forecasts of Larry Smith for Orleans and St. Bernard Parishes.

B. Growth Areas

Details of available land, the developed area and the direction and rate of growth are essential in defining the present and future waste disposal problem of the Tri-Parish area, and in understanding present collection and disposal practices that prevail in the area.

The gross land area of the Tri-Parish area consists of some 1,115 square miles or 711,520 acres. Orleans Parish (City of New Orleans) with the greater ratio of population, contains the lesser land area with approximately 200 square miles or 127,360 acres. St. Bernard Parish with a gross land area of some 405 square miles and Jefferson Parish with about 510 square miles jointly contain 82% of the total Tri-Parish land area. Figure I-1 (backcover) illustrating the relationship of these Parishes, also shows vast areas of marshlands that generally remain inaccessible today. Only some 160 square miles or 14.5% of the total Tri-Parish land area is presently developed or being developed. The principal developed areas is generally contained within a ten to twelve mile radius or a nominal 25 minute driving time range from the Central Business District of the City of New Orleans, with the majority of the population located in the Eastbank communities. The geographic barrier of the Mississippi River with its limited crossings was the chief deterent, affecting the rate of growth of the Westbank area prior to 1900. It was not until the 1920-30 decade, that the Westbank began to show significant population growth, as may be noted in Table II-2.

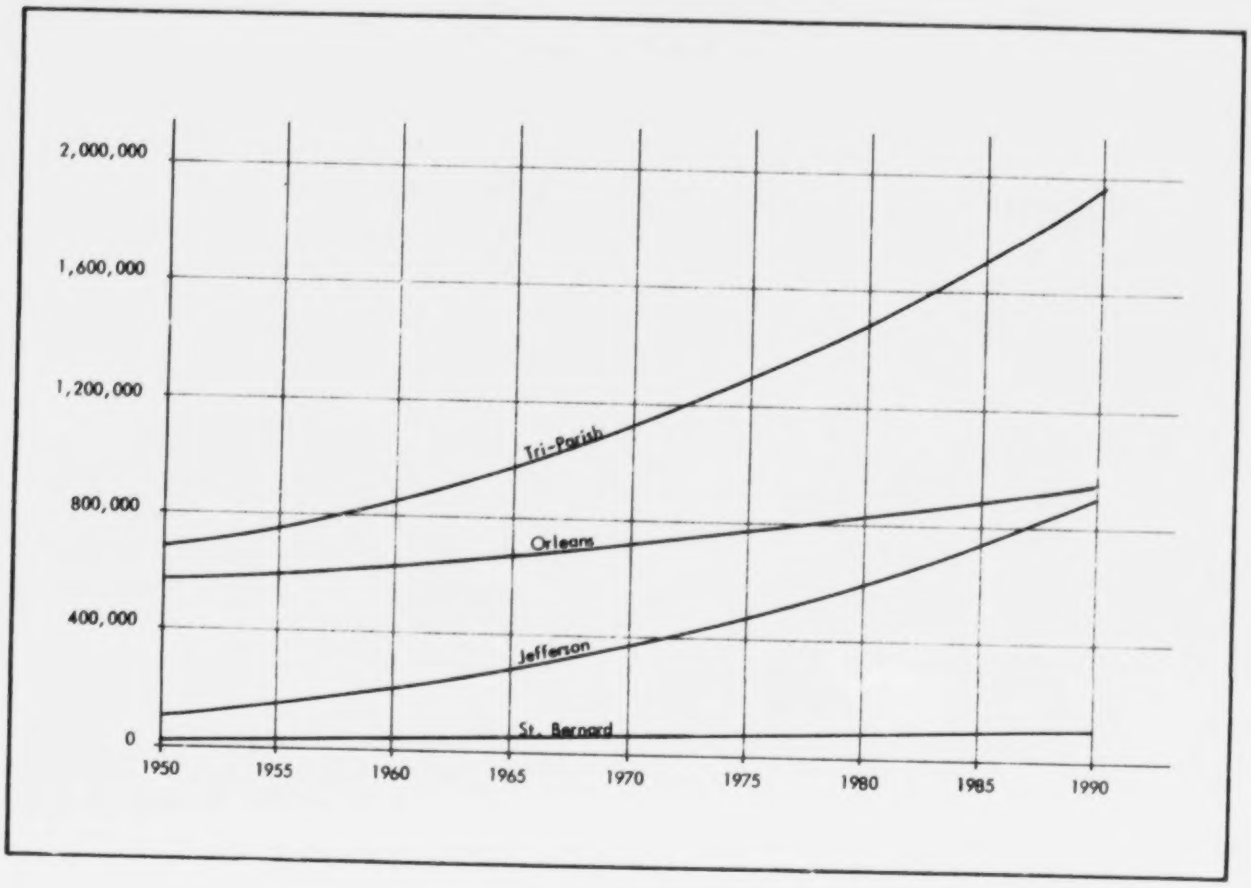
Historic evolution of the communities within this Tri-Parish area and their respective population growths has produced eight separate and distinct populous areas with differing characteristics of government.



POPULATION FORECASTS FOR THE TRI-PARISH AREA

FIG. II-1

FIGURE II-2
POPULATION FORECAST BY PARISHES



Referring again to Figure I-1 (backcover) and Table II-4, the geographic relationship of the communities of the Tri-Parish area will be noted, together with current and forecast population growth of each over the next two decades.

Principal areas for new expansion to meet forecast population growth are limited. In Jefferson Parish the Eastbank unincorporated area and the Cities of Kenner and

Harahan are confined by their present boundaries. Though population is expected to increase by 160,000 in the 1970-1980 decade and about 210,000 in the 1980-1990 decade, this growth will all be within existing limits. However, extensive land reclamation projects along the lakeshore area, presently programmed over a twenty year development period, will add substantial land area of premium value within these limits. The Westbank area of Jefferson, in addition to "fill-in" in the populous areas generally paralleling the River to a two-mile depth, offers extensive areas for future development to the south bounded by Plaquemines Parish (to the east) and St. Charles and LaFourche Parishes (to the west). The ultimate potential of Jefferson Parish growth after the year 2000 is predicted to be in the vast areas of the Westbank. Jefferson Westbank population is expected to increase by 65,000 from 1970-1980 and about 125,000 from 1980 to 1990 with the principal increases likely to occur in the two mile wide band paralleling the River.

Principal developed areas of St. Bernard Parish also parallel the River, extending eastward some three miles from its common boundary with the City of New Orleans. Sparsely populated areas parallel the River to the southeast. Principal areas for expansion lie to the west and southwest, bounded on the north by the Parish line and Lake Borgne and to the south by Plaquemines Parish. During the 1970-1980 decade a total population growth of 24,500 is forecast for St. Bernard with an additional population increase of 26,000 expected in the 1980-1990 decade.

The major developed area of the City of New Orleans, generally referred to as Orleans Central, is contained within the boundaries formed by Jefferson Parish to the west, Lake Pontchartrain to the north, the River and Intracoastal Waterway to the south, and the Industrial Canal to the east. The area east of the Industrial Canal, generally referred to as New Orleans East, today is only partially developed, but is one of the principal growth areas of the City. In addition to the above, the Westbank community of Algiers, a part of New Orleans and generally referred to as Orleans South, is substantially developed in that area lying north of the Algiers Canal (Intracoastal Waterway). This area is bounded by the River and its common boundaries with Jefferson and Plaquemines Parishes.

A total population growth of 108,500 is forecast in the 1970-1980 decade for New Orleans of which about 20% or 22,000 is expected to occur in Orleans South, 53% or 57,500 in Orleans East and the balance, 27% or 29,000, occurring in the Orleans Central area.

During the 1980-1990 decade additional population growth of 115,000 is forecast with the projected distribution expected at 27% or 31,000 in Orleans South, 55%

or 63,000 in Orleans East, and 18% or 21,000 in Orleans Central. By 1990 Orleans Central is expected to approach its ultimate population capacity.

C. Application to the Metropolitan Solid Waste Study

Population distribution within the Metropolitan Area, to be meaningful, for purposes of this study, must be correlated to each solid waste collection and disposal system existing in the area. Those communities of the Metropolitan New Orleans Area as listed in Tables II-2 and II-4 each have independent systems. Each of these communities, other than the City of New Orleans proper, is operating with a single collection district and independent disposal facilities. The importance of producing reasonably accurate population estimates for each collection district is, of course, to provide the basis for calculating current and future per capita waste production factors of each area.

The City of New Orleans with its large developed area and high percentage (67%) of the metropolitan population is sub-divided into six separate districts, functioning independently, but under central supervision of the Sanitation Department. It follows that further detail on population distribution within this City is necessary for application in this report. We have reviewed census reports and comprehensive planning studies of present and future population distribution to the year 1990. Data available and presented in these planning studies provided 1965 distribution on a block-by-block basis in the City, as well as summaries by planning sections and planning areas as illustrated in Table II-5.

Correlation of this data for application in this study required plotting the present collection district boundaries (Sanitation Department) on available planning maps, then recording composition of each pertinent area by planning units. This analysis involved considerable manual recording of data and with the assistance of the Data Processing Department of the City of New Orleans computations of population distribution were compiled in summary form by collection routes and districts. The base year of this estimate was 1965. Population projections were then manually calculated by collection districts, based upon planning forecasts of the various planning units composing each district. The summary of these forecasts covering the period 1967 to 1990 is shown in Table V-33 (Page V-61) which presents population distribution by each of the City's collection districts.

TABLE II-5
POPULATION DISTRIBUTION CITY OF NEW ORLEANS 1960 - 1990

Plan. Sec. No.	Planning Area and Section	1960	1965	1967	1970	1975	1980	1985	1990
	Orleans Central								
1	Lakeview	21,350	23,650	24,190	25,000	27,000	29,000	31,000	33,200
2	Gentilly	70,697	80,300	81,380	83,000	86,000	89,000	92,000	93,000
3	Broadmoor	56,636	60,300	60,980	62,000	63,000	64,000	65,000	66,000
4	Mid-City	106,912	104,350	104,610	105,000	105,000	105,000	105,000	103,000
5	Bywater	71,049	64,200	64,520	65,000	67,000	71,000	74,000	76,000
6	Carrollton	33,129	30,000	30,000	30,000	30,000	31,000	31,000	31,300
7	University	62,171	67,750	68,250	69,000	70,000	71,000	72,000	73,000
8	Lafayette	76,667	81,650	81,790	82,000	83,000	84,000	85,000	84,000
9	Central Business District	37,618	38,350	39,010	40,000	43,000	46,000	50,000	54,000
	TOTAL Orleans Central	536,229	550,550	554,730	561,000	574,000	590,000	605,000	613,500
	Orleans East								
10	Downtown	33,002	39,050	39,230	39,500	40,000	40,500	41,000	41,500
11	Edgelake	7,333	10,400	13,440	18,000	24,500	33,000	41,000	47,000
11 c	East Lakefront					3,000	10,000	16,000	22,400
12	East Gentilly	13,149	19,600	22,960	28,000	35,000	41,000	47,500	52,500
16	New Orleans East	118	1,850	3,910	7,000	15,500	25,500	36,000	46,000
18	Visvant	2,370	1,150	1,090	1,000	500			
19	Chef-Rigolets	592	1,450	1,670	2,000	2,500	3,000	3,500	4,100
	TOTAL Orleans East	56,564	73,500	82,300	95,500	121,000	153,000	185,000	213,500
	Orleans South								
13	Algiers	25,486	31,200	32,920	35,500	39,000	41,000	42,000	44,000
14	Aurora	8,327	13,400	15,240	18,000	23,000	28,000	31,000	35,000
15	Elmwood	517	550	1,490	2,900	5,000	8,000	14,000	27,000
17	Lower Algiers	402	450	510	600	1,000	2,000	3,000	4,000
	TOTAL Orleans South	34,732	45,600	50,160	57,000	68,000	79,000	90,000	110,000
TOTAL	City of New Orleans	627,525	669,650	687,190	713,500	763,000	822,000	880,000	937,000

III COLLECTION AND DISPOSAL PRACTICES IN THE AREA

A. History of Disposal

Available history of the Metropolitan Area concerned with solid waste disposal practices is generally centered around the City of New Orleans. With the first incinerator installation constructed in Algiers in 1916, the City started a program for waste disposal, contemplating the burning eventually of all household refuse. In 1920 to 1925 planning of additional incinerator installation was accelerated due to a few cases of bubonic plague. Public Health authorities and the City government programmed four additional incinerators in the Eastbank area of the City with the first plant being constructed in 1922 at the location of Genois and Perdido Streets. In 1925 bond issues provided funds for the construction of the three additional Eastbank incinerators during the years 1928 and 1929 which were all in operation by December of 1929. During the next five years, all household garbage was disposed of by incineration. However, restricted budgets during the Depression years, 1934 and 1935, required ceasing operation of one of the Eastbank plants, during which time a portion of household refuse was diverted to the landfill areas utilized by the producers of commercial refuse and private haulers. By 1940 after expansions and improvements to the then existing plants all were again in operation, permitting all household garbage and refuse to be disposed of once again by incineration.

During the period of World War II, additional diversion of refuse to landfills became necessary because of lack of labor for incinerator plant operation. By the time operation was resumed at the end of the war years, production had reached a point where practically no reserve burning capacity existed in the incinerator plants. In 1948, a reduced budget again resulted in closing of two incinerators and resumed use of landfills for supplementary refuse disposal. Over the years various landfill locations have been utilized by the City of New Orleans, including the agricultural dump (Agriculture Street), Old Gentilly Highway locations, landfills on the bature in front of Audubon Park, City Park, and several locations in Algiers on the Westbank. During the late 1940's private salvage contracts were in force for the reclamation of saleable articles including rags, paper, bottles, tin cans and various other metals. This contract was later discontinued due to increasing labor costs and diminishing markets.

Since 1948, landfills continued to receive increasing quantities of waste, until the construction in 1957 of the Florida Avenue and the Seventh Street Incinerators and later augmented by the Algiers plant in 1961. With continuing increase in population and waste production, as well as gradual obsolescence of the older plants, two new incinerators (New Orleans East and St. Louis) were under construction in 1966 and are expected to be in full operation by 1968.

Following the various cycles of incineration and landfill operation since 1916, the City of New Orleans Sanitation Department again today is faced with determining the most suitable method of solid waste disposal that will be acceptable to the City Administration, Public Health authorities, and the public.

Jefferson Parish, followed a pattern similar to that of New Orleans, utilizing landfill operations as the predominant means for disposal of solid wastes, until the construction of the David Drive Incinerator located in the Eastbank Unincorporated Area. That plant operated until 1962 and handled about 60% of the area wastes generated at the time of its replacement by a modern plant facility. The new plant, the Eastbank Incinerator, operating since 1962, is presently handling nearly all putrescible wastes generated in the Unincorporated Area, as well as wastes collected in the City of Harahan. It has a substantial surplus burning capacity remaining at this time. The City of Kenner is the only community in the Eastbank Area which continues to utilize open dumping as a means of disposal. The Westbank communities in Jefferson Parish also utilized open burning as their principal means of refuse disposal, until the early fifties, at which time small plants were built in the City of Gretna and the Unincorporated Westbank Area. The general intent of operation of those plants was for the disposal of the majority of putrescible wastes generated in these communities with the balance of wastes handled by the open dumping method. Those plants by comparison to today's modern incinerator facilities would be considered obsolete. The City of Westwego is the only community in the Westbank Area which continues to utilize open dumping exclusively, as a means of disposal.

Methods of solid waste disposal in St. Bernard Parish have been generally limited to that of open burning dumps, with such operation continuing up to the present time. However, in late 1966, the Parish after investigation of their solid waste disposal problems, awarded a contract for construction of their first incinerator. This plant, though generally complete, is not in operation at this date. It is anticipated that the capacity of this plant will be adequate to handle all putrescible wastes generated in the presently developed area of St. Bernard Parish.

Previous reports have emphasized area factors affecting the selection of a long range program for waste disposal. The principal factors, concerned with the geography, physiography, and economy of the area, as well as the character and habits of the population are: (1) Long, hot, humid summers promoting rapid decomposition of garbage; (2) Excessive rainfall; (3) Rapid seasonal growth of vegetation; (4) Natural soil is not suitable as cover material for disposal method by sanitary fill; (5) Flat terrain and elevations below sea level of over 60% of inhabited areas create difficult drainage problems; (6) Mixed population; (7) Habits of refuse preparation, storing and collection acquired over generations; and (8) Change in composition of refuse material.

In the early 1920's refuse was composed of 60% rubbish and 40% garbage. Declining percentages of garbage in the composition of waste has been due to more complete food processing at processing plants, extensive use of refrigeration, and expanding use of domestic garbage disposal equipment. The increase in the production of rubbish (non-food waste) is due largely to continued progress in development of containers for packaging processed foods and other consumer products.

B. Existing Public Solid Waste Systems in the Area

Each of the eight communities in the Tri-Parish area (Unincorporated and Incorporated areas) differ widely in their methods of handling public services including the collection and disposal of solid wastes. Orleans Parish and St. Bernard Parish have singular control in their collection and disposal of solid wastes, with the City of New Orleans Sanitation Department and the St. Bernard Garbage Department operating these services in their respective areas of jurisdiction. Jefferson Parish introduces complexities to the regional (Tri-Parish) waste disposal program under consideration. It has six separate systems of waste collection and disposal contained within the Parish boundaries. The entire Eastbank area, including the Unincorporated area, the City of Harahan and the City of Kenner, each operate with independent private contracts covering both collection and disposal of solid wastes and providing services to households and small commercial installations. In addition to the private contractor services, each of these communities provide public collection systems for the collection of oversize wastes. Conversely the solid waste systems of the communities of the Westbank, including the Unincorporated area, the City of Gretna, and the City of Westwego each operate independent collection and disposal services.

By and large, the scope of services provided by each of these communities is similar, in that the public services are in practice limited to household and small commercial installations with the commercial collectors in the area servicing multi-family apartments, high rise developments, and large commercial and industrial installations.

Though the scope of services are similar in all of these communities, wide variations occur in actually providing these services. Major variations include:

1. Frequency of collection services vary from two times per week in the Eastbank Unincorporated area of Jefferson Parish to six times per week as provided by St. Bernard Parish.

2. Though the type of service, i.e., curb and alley pickup is generally common in all communities, required preparation of refuse for separate pickup of household garbage and supplementary pickups of rubbish will be found in the City of Gretna which varies from the more common combined pickup that will be found in the other communities.

3. Methods of funding these public services varies between funds provided exclusively from revenues generated from tax sources, to combinations of tax revenues and direct service charges. Variables also occur between communities in the basis of determining assessed valuations, as well as the mileage rate applicable to solid waste and the rates established as direct service charge to the recipients of these services.

4. The cost of collection and disposal services varies extremely between these communities. Costs vary due to the size of the community, closeness of supervision, and attitude toward equipment maintenance and housekeeping. Collection costs also vary with the density of population, type and frequency of service, type of collection equipment used, and haul distances to the disposal facilities. Variation in disposal costs are affected by the volume of wastes handled, and method of disposal vs. the crew size and equipment investment.

As noted in the foregoing text, methods of collection as well as disposal vary considerable between the communities, with either incinerator or landfill operations or combinations of both servicing the communities. Tables III-1, III-2, and III-3 provide brief descriptions and comparisons of these various systems and facilities. Reference to Figure I-1 (backcover) shows the relationship of the communities, districts, and disposal facilities. In order to further illustrate the magnitude of the Tri-Parish solid waste problem, we have prepared Tables III-4 and III-5 showing hourly and daily variations in refuse collection activities at selected disposal points as observed in actual field studies conducted during December 1967 and January 1968. Chapters V and VI of the text will explore the systems of each of these communities in greater depth with analyses of quantities and types of wastes produced and further details of the field surveys.

TABLE III-1
REFUSE COLLECTION DISTRICT AND PRESENT DISPOSAL FACILITIES

Orleans Parish	
Night District	Seventh Street Incinerator
Central District	Seventh Street Incinerator
Western District	St. Louis Incinerator as transfer station to Algiers Landfill
Eastern I District	Florida Avenue Incinerator
Eastern II District	N. O. East Incinerator in partial operation Remainder to Gentilly Landfill
Algiers District	Algiers Incinerator
Private Collectors	Algiers, Gentilly and New Orleans Disposal Co. Landfills
Jefferson Parish	
East Bank Unincorporated	David Drive Incinerator
Harahan	David Drive Incinerator
Kenner	St. Charles Parish Landfill
West Bank Unincorporated	Marrero Incinerator Parish Landfill
Westwego	Westwego Landfill
Gretna	Gretna Incinerator Gretna Landfill
St. Bernard Parish	St. Bernard Incinerator (not in use) St. Bernard Landfill
Private Collectors	Private Landfill

TABLE III-2
COLLECTION SYSTEMS OF THE TRI-PARISH AREA COMMUNITIES

Community	Owner	Trucks		Type Collection	Frequency and Type Refuse Collected				Point of Disposal
		No.	Type		Garbage	Trash	Combined	Oversize	
St. Bernard Parish	Parish	10	Packers	Curb	6/Wk	-	-	-	Parish Dump
		5	Stake Body		-	2/Wk	-	Continuous	
Jefferson Parish									
Eastbank Uninc. Area	Contractor	17 5	Packers Stake Body	Curb	-	-	2/Wk	-	Eastbank Incinerator
	Parish	NA	NA		-	-	-	1/Wk	Westbank Dump
Kenner	Contractor	4	Packers	Curb	-	-	3/Wk	-	St. Charles Private Dump
	City	1	Packers		-	-	1/Wk	-	" " " "
	City	1	Stake Body					1/Wk	City Dump
Harahan	Contractor	NA	Packers	Curb	-	-	3/Wk	-	Eastbank Incinerator
	City	NA	NA		-	-	-	1/Wk	Westbank Dump
Westbank Uninc. Area	Parish	16	Packers	Curb	-	-	*3/Wk	-	Marrero Incinerator
	Parish	4	Stake Body		-	-	-	1/Wk	and Westbank Dump
Westwego	City	3	Packers	Curb	-	-	5/Wk	-	City Dump
	City	2	Stake Body		-	-	-	5/Wk	
Gretna	City	6	Packers	Curb	3/Wk	-	-	-	City Incinerator
	City	13	Stake Body			3/Wk	-	Continuous	City Dump
City of New Orleans	City	125	Packers	Curb	-	-	3/Wk		3 City Incinerators
	City	13	Misc.		-	-	-	On Call	2 City Dumps

Notes
1. Frequency of collection in the community of Terrytown is provided only 2 times per week.
2. See pages VI-2 through VI-9 for further detail of individual collection systems of St. Bernard and Jefferson Parish and pages V-13 through V-28 for City of New Orleans.
3. See Table VI-2, Page VI-22 for Cost Data – Jefferson and St. Bernard Parishes.

TABLE III-3
EXISTING TRI-PARISH DISPOSAL FACILITIES

Type, Location, Owner	Type of Refuse	Rated Capacity Tons/Day	Residue Disposal	Present Usage Tons/Day
EXISTING INCINERATORS				
City of New Orleans				
Seventh Street	Garbage & Trash	400	Algiers Dump	270
St. Louis Street	Garbage & Trash	450	N. A.	under construction
Florida Avenue	Garbage & Trash	400	Gentilly Dump	200
Algiers	Garbage & Trash	200	Algiers Dump	150
New Orleans East #1	Garbage & Trash	400	Gentilly Dump	under construction
St. Bernard Parish				
Paris Road	Garbage	100		under construction
Jefferson Parish				
Westbank (Marrero)	Garbage	90	Westbank Dump	60
Gretna (City of Gretna)	Garbage	100	Gretna Dump	30
Eastbank (David Drive)	Garbage & Trash	400	Hattaway Dump	220
EXISTING LANDFILLS				
City of New Orleans				
Algiers	Non Comb. Oversize, Residue			350
Gentilly	Non Comb. Oversize, Residue			600
New Orleans Disposal Co.	Garbage, Trash, Non Comb. Oversize			230
St. Bernard				
Parish Dump - Paris Road	Trash. Oversize			68
Private Dump - Paris Road	Trash, Oversize, Non Comb.			8
Jefferson Parish				
Westbank - (U.S. Hwy #90)	Trash, Oversize, Residue			180
Gretna - (City of Gretna)	Trash, Oversize, Residue			20
Westwego - (City of Westwego)	Garbage, Trash, Oversize			30
Kenner - (City of Kenner)	Trash			10
Hattaway Disposal Co.	Garbage, Trash, Oversize			36

Notes:
(1) See Figure I-1 (Backcover) for location of the above community disposal facilities.
(2) All landfills are operated as open dumps in violation of accepted standards.
(3) Existing facilities to be utilized in future program includes only St. Louis, Algiers, New Orleans East, Paris Road and David Drive Incinerators.
(4) Detailed descriptions of individual facilities may be found on pages V-80 through V-98 and VI-10 through VI-19.

TABLE III-4
TYPICAL HOURLY VARIATION IN REFUSE COLLECTIONS RECEIVED AT SELECTED DISPOSAL POINTS

LOCATION			% of Daily Loads & Tons Handled Hourly										
			0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600
Seventh Street Incinerator													
Municipal -	Loads	69	-	4.3	18.9	24.6	16.0	17.5	11.6	1.4	5.7	-	-
	Tons	172.0	-	5.4	24.4	23.3	16.9	14.9	9.9	1.3	3.9	-	-
Comm. & Private -	Loads	32	-	6.2	6.2	-	3.1	6.2	6.2	37.6	34.5	-	-
	Tons	7.1	-	2.8	15.6	-	4.2	22.5	2.8	23.9	28.2	-	-
Combined -	Loads	101	-	5.0	14.8	16.8	11.9	13.9	9.9	12.9	14.8	-	-
	Tons	179.1	-	5.3	24.1	22.4	16.4	15.2	9.5	2.2	4.9	-	-
Jefferson Eastbank Incinerator													
Municipal -	Loads	51	-	23.6	3.9	19.7	7.8	7.8	7.8	9.8	3.9	15.7	-
	Tons	215.1	-	26.6	5.1	20.4	6.1	4.7	7.9	7.9	3.5	17.8	-
Comm. & Private -	Loads	12	-	-	8.3	-	16.7	8.3	25.0	25.0	16.7	-	-
	Tons	3.2	-	-	6.2	-	31.4	3.1	18.8	28.0	12.5	-	-
Combined -	Loads	63	-	19.1	4.8	15.9	9.5	7.9	11.1	12.7	6.3	12.7	-
	Tons	218.3	-	26.2	5.2	20.1	6.5	4.7	8.0	8.2	3.7	17.4	-
Gentilly Landfill													
Municipal -	Loads	89	-	3.4	16.9	20.2	23.7	13.5	7.9	6.8	5.6	2.2	-
	Tons	303.9	-	3.7	23.7	20.7	22.8	11.1	5.3	7.1	3.9	1.7	-
Comm. & Private -	Loads	186	7.0	2.1	5.9	8.1	11.8	11.3	11.3	7.5	16.1	8.6	10.2
	Tons	342.6	8.9	4.5	7.5	9.1	13.7	13.9	11.3	5.8	8.7	8.5	8.1
Combined -	Loads	275	4.7	2.5	9.5	12.0	15.6	12.0	10.2	7.3	12.7	6.6	6.9
	Tons	646.5	4.7	4.1	15.1	14.5	18.1	12.6	8.5	6.4	6.4	5.3	4.3

TABLE III-5
DAILY VARIATION IN TRI-PARISH REFUSE COLLECTION
% of Average Day

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Municipal Collections:						
% Avg. No. Loads/Day	106	93	103	106	109	81
% Avg. Tons/Day	116	95	98	101	105	88
Comm. & Private Collections:						
% Avg. No. Loads/Day	95	95	101	97	100	112
% Avg. Tons/Day	101	94	103	109	112	82
Combined Collections:						
% Avg. No. Loads/Day	100	94	102	101	104	100
% Avg. Tons/Day	110	94	99	104	107	85

Note: Above data based on field observations at 13 points of disposal during December 1967 and January 1968

Avg. Day (100%)		
Municipal Collection:	386 Loads	1,259 Tons
Comm. & Private Collection:	566 Loads	949 Tons
Combined Collection:	952 Loads	2,208 Tons

C. Private Collection and Disposal Services

Private collection and disposal services, supplementing the area's public solid waste systems, consist of complete contractor services, collection services, on-site incinerators and landfills operated by individual enterprises for their own use, as well as private dumps operated for profit through salvage and/or direct dumping charges.

A limited number of firms provide complete collection and disposal services within the Tri-parish Area. New Orleans Disposal Company, Inc. is the principal firm serving commerce and industry. Operating from modern plant facilities, centrally located in the City of New Orleans, this firm is servicing accounts with a well maintained collection fleet of some 50 radio-equipped vehicles of various types. The type of service offered by this company is that of container service operation. The principal point and method of disposal utilized by this company is their privately operated landfill located on the Orleans - St. Bernard Parish line, south of Bayou Bienvenue. This landfill, though an open burning dump, is generally run in an orderly fashion, with adequate equipment on site to follow up rapidly in the compaction, grading, and final application of cover material.

Jefferson Disposal Company, Inc. with its subsidiaries is the principal firm providing contract collection and disposal services to community governments in the area. It presently serves the Unincorporated Eastbank Area of Jefferson, as well as the City of Harahan and is also active in contract services with commerce and industry. This firm operates from modern plant facilities located in Jefferson Parish Eastbank Area under lease from Jefferson Parish. The majority of wastes collected under their public service contracts are delivered to the Eastbank incinerator for disposal. This firm operates with a well maintained fleet of about 40 radio-equipped vehicles, as required for collection and disposal operation.

Hattaway Disposal Company services the City of Kenner under contract for collection and disposal of wastes generated by household and small commercial installations. Operating with a small compactor truck collection fleet, wastes are hauled into St. Charles Parish to the contractor's operated landfill, located some 7 miles west of the Jefferson Parish line. There is a limited number of other independent collection contractors, operating with enclosed compactor type vehicles in the Tri-Parish area, however, there are innumerable open truck owners operating as independent general haulers. Their waste hauling activities vary with the demand. Available statistics obtained from local licensing agencies generally does not classify or limit trucks by types of use.

On-site incinerators and landfill operations are not uncommon in the area. On-site incineration is found consistently in the commercial-retail installations throughout the area, with concentrations in the high-rise structures of the Central Business Districts. In one major industrial complex in the New Orleans East area, the NASA Complex, an on-site landfill operation is presently being conducted for disposal of their own wastes. The method of operation of this landfill closely approaches the concept of a true sanitary landfill and from our observations is the only comparable one in existence in the New Orleans area. This is made economically feasible by large stock piles of cover material that remained from dredging the Industrial Canal in the NASA Complex area. This landfill is receiving a combination of food wastes, commercial and industrial wastes generated by the various firms within the complex. Due to a rapidly diminishing supply of cover material, management of this complex is anticipating early construction of an incinerator plant to handle all wastes generated from their combined operations. A small on-site incinerator currently exists at this complex for the destruction of classified materials, principally paper products.

Various industrial firms operate on-site landfills or landfills remote from the developed areas for disposal of hard fill materials generated by their own operations. This "self" disposal is augmented by many commercial and industrial firms transporting wastes by their own trucks to public and privately operated landfills.

In the communities with higher growth rates, such as the Jefferson Eastbank area, garbage grinder installations are common place in both single family units and the numerous multi-family garden apartment complexes. High density apartment districts with grinder installations appear to reduce household collections some 25% by weight but negligible volume reduction occurs.

Quantities of combustible wastes handled by on-site disposal facilities in the overall Tri-parish area are generally minimal and their effect is noticeable only by limited areas of concentrated use.

D. Private vs. Municipal Operation of Refuse Collection and Disposal Systems

The preceding review of area collection and disposal practices shows wide variations in methods of management of the solid waste systems of the various Tri-parish communities. Private enterprise participation in management of the public systems in Jefferson Parish is the most significant departure in the area from normal practices in that the three communities comprising the Eastbank area of Jefferson Parish (the Unincorporated Area, the City of Harahan, and the City of Kenner) have entered into contractual agreements for collection and disposal services within the past two years.

The Jefferson Parish contractual agreement with the private firm of Jefferson Disposal Company, Inc., (as required by bidding specifications) includes not only collection of refuse, but also operation and maintenance of the Parish owned and built Eastbank Incinerator. Later contractual arrangements between WES Enterprises, Inc. (a subsidiary company of Jefferson Disposal Co., Inc.) and the City of Harahan also included collection services with the disposal of wastes to be handled by incineration at the Eastbank Incinerator. The latter, of course, occurred with the approval of Jefferson Parish authorities.

The City of Kenner, after seeking bids, entered into contract for services including collection and disposal of wastes. In this case, however, the contractor, Hattaway Disposal Company, provided disposal in their privately operated landfill located in adjacent St. Charles Parish.

These local examples of "packaged services" for both collection and disposal of wastes differ somewhat from the normal contractual services presently being experienced in other areas. There are numerous cases in the United States where household refuse is collected by private agencies operating through contracts with the municipal authorities. A survey of some 956 cities in the United States and Canada, conducted in 1964 by the American Public Works Association, listed 225 cities or 23.5% of all cities surveyed, where refuse collection is by contract with the municipality. This type of service is most often found in small communities where there is an insufficient quantity of refuse to justify operating a municipal service and where a private collector can operate economically, particularly if he has contracts with several communities.

This aforementioned survey showed some notable exceptions for large communities which are listed below.

	Population
San Francisco, California	750,000
Seattle, Washington	557,000
Baltimore County, Maryland	500,000
Omaha, Nebraska	301,000
Ottawa, Canada	259,000
San Jose, California	203,000
Anaheim, California	118,000
Peoria, Illinois	103,000
Santa Ana, California	100,000

In most of the communities, where municipal contracts with private collectors exist, disposal is generally handled by open dumping or sanitary landfill.

In recent years there have been a number of instances where cities have undertaken to contract refuse disposal to private contractors on the basis of the private collector owning and operating the facilities and receiving a disposal fee for their use. Recently, the City of Houston, Texas, let four contracts; three for the construction of compost plants and one for the construction of an incinerator. Each to be constructed and financed by private capital with payments to be made from disposal fee revenues from the use of the facilities charged to the municipality as well as other users. Similarly, the City of St. Petersburg, Florida, entered into two separate contracts for disposal of wastes which required the private construction and operation of an incinerator plant and a compost plant. The above contracts differed from the Eastbank Jefferson Parish contract in that the local disposal facility was built by the Parish, taking advantage of the lower financing costs. The Parish originally operated the facility for a period of about two years. When faced with rising costs, lack of trained manpower, and costly breakdowns, the Parish requested bids and awarded a contract for private operation of the facility in mid-1966. The contract is in its second year of operation and a successful working arrangement has apparently been achieved.

The principal advantages of contracting refuse collection and disposal to private enterprises are as follows:

1. A firm basis of cost is guaranteed to the City for the contract period.
2. Periodic bidding insures the minimum cost for the City.
3. Limitation of responsibility for social and fringe benefits on payroll.
4. Freedom from political pressure in management.
5. The opportunity to utilize the most efficient methods and equipment.
6. The opportunity of adopting personnel policies that will attract the most competent personnel.
7. The opportunity to establish optimum crew sizes.

The principal disadvantages of this system are:

1. Lack of direct contact between the City and its inhabitants in providing a necessary municipal service.

2. Difficulty in anticipating possible cost increases beyond the effective contract period.

3. Selection of bid specifications that will limit bidding to reputable and experienced contractors, yet not discourage competition of those most qualified.

4. The payment of taxes and earning a profit may make this method more expensive.

Further data, covering each of the private contracts in effect in Jefferson Parish, is presented in Chapter VI with more detailed discussions of the solid waste system used in the individual communities.

E. Area Ordinances

The ordinances which are now in force within the principal communities of the Tri-Parish area covering the collection of solid waste by or on account of the municipal agency are similar in scope. A digest of the Ordinances for Orleans and Jefferson parishes and of the bid specifications for the City of Kenner are included in Appendix I. It goes without saying that the larger communities (the City of New Orleans and the Unincorporated Areas of Jefferson Parish) have, of necessity, developed ordinances over the years of their growth that are comprehensive in coverage, whereas the smaller communities, in their developing stages, have adopted only those minimum regulations appearing to be necessary. In the case of St. Bernard Parish, this community has not yet officially adopted regulations covering any phase of solid waste collection or disposal. However, officials of this community are aware of the need and are now in the process of formulating ordinances covering regulations in this field.

State regulations on disposal of solid wastes provide minimum standards concerned with the accumulation and collection of refuse as well as methods of disposal and operation of disposal facilities. These regulations are presented in Appendix 1-E.

The ordinances of the City of New Orleans and Jefferson Parish define the kinds and classes of refuse, handling requirements, detail of collection services, and methods and permitted means of disposal, as well as defining the responsibility for administration of these services and enforcement of the regulating ordinances. These ordinances provide detailed explanations of the pre-collection practices that are expected of those receiving service, such as preparation of refuse, container requirements, weight limitations, and in the case of bundled rubbish, length limitations. The scope of the ordinances further sets forth limitations as to types of properties that are entitled to receive this public service, generally the small producers of waste such as residential and small commercial installations and specifically excluding industrial establishments. Without exception all the communities require curb and alley locations of containers for collection. Specified frequency of collection varies substantially from community to community with pickup occurring as often as six times per week and as few as twice a week. Conformity in container standards exists among all communities which require containers of either metal or other approved material, with watertight covers. In New Orleans and Jefferson two 30-gallon containers or three bundles of trash, or reasonable combinations thereof are the limiting factors. Allowable container weights and volumes vary slightly from community to community. The ordinances also specify certain special services such as the collection of small dead animals and oversize trash which are generally collected upon notification by the residents. Private collection vehicles and methods of disposal are also regulated by ordinance. Regulations concerned with waste disposal prohibit open dumping and burning in some communities, opposed to relatively no regulation or control existing in neighboring communities. No pollution control regulations exist in any of the communities.

Existing ordinances vary considerably in regards to financing and payment for services. As a general rule, all communities provide at least a part of the operating funds of the solid waste system through property tax assessments with the rate varying from 4 mils to 7 mils among the communities. In Jefferson Parish a service charge supplements the tax revenues varying from as little as 20 to 50 cents per month.

Failure to comply with regulations stipulated by ordinance carries penalties ranging from $2.50 to $100.00 per violation and/or three days to ninety days imprisonment, or both.

Enforcement of these regulations for all practical purposes is very minor in the area due partially to the lack of adequate funds and manpower for issuing violation notices, following up to verify compliance or fining of repeated violators. Violations in some cases are probably due to ignorance of the requirements by the residents and lack of effective communication between the regulating agency and citizenry.

F. Salvage and Reclamation

In the Tri-parish Area various special disposal problems are partially handled by private enterprise through salvage and reclamation of certain waste materials. Revenues generated from salvage of waste materials has been of varying importance to municipal collections and disposal systems in past years. With a strong fluctuation in the markets for salvage material, as well as the rising costs of salvage, municipal participation in this field has gradually diminished. In the Tri-parish Area today, nearly all salvage activities are handled by private contractors.

1. Basic Salvage Materials

Salvage contractors in the area, generally specializing in a particular material, include those dealing with paper, cullet, rags, non-ferrous metals, ferrous metals and building materials. Generally, materials handled by salvage contractors in the area are selected and collected directly by the contractor prior to being mixed with other general refuse. Also, materials are delivered to the contractor by individuals who hand pick the products from local dumps and other sources.

Other than dealers in scrap metal and used building materials, a very limited number of salvage contractors serve the area and it appears that they provide adequate services to meet the local need.

2. Abandoned and Junk Automobiles

Numerous salvage lots and garages engaged in automobile salvage operations are active in the Tri-parish Area. Initial salvaging or stripping of automobiles handled by salvagers may see the immediate removal of all usable spare parts or the automobile itself may be used as a "warehouse" until the need for its parts occur. Timing of salvage, of course, depends on the demand and the availability of labor. Whatever the time element may be, ultimately the remaining hulk, chassis and body, must in effect be stored for lack of a permanent point of disposal, method of destruction, or further reclamation, as may be seen by observation of the many "storage" yards throughout the area.

Abandoned vehicles on the highways and the streets pose a problem that is common to all the communities of the Tri-parish Area. As in other areas, these automobiles are usually found stripped of all readily usable and saleable parts that would be of interest and profit to commercial salvage yards. Their value in the condition that they are found hardly would warrant the cost of removal. However, they must be removed by municipal authorities or under local governmental control and stored temporarily by the collecting agency until the hulk is claimed by the owner (which rarely occurs) or legal permit to junk is obtained and then later hauled to commercial storage yards. The invested costs for removal, temporary storage and transfer to permanent storage yards generally exceeds the salvage value.

Various methods and arrangements exist for the pickup and removal of abandoned automobiles in each of the Tri-parish communities. However, by observation, it is apparent that the rate of removal does not quite keep pace with the need on a day to day basis. Although each of the communities is making sincere efforts to keep the streets free of the abandoned vehicles, the solution of providing a local means for ultimate disposal still remains to be developed.

It is estimated that approximately 10,000 abandoned automobiles are collected annually in the Tri-parisl Area. Table III-6 illustrates the estimated number of automobiles collected by each of the communities in the Tri-parish Area during 1967. This Table shows the number of vehicles picked up for storage or disposal and does not reflect the total number of vehicles abandoned in the streets and highways.

TABLE III-6

ESTIMATED NUMBER OF ABANDONED VEHICLES COLLECTED ANNUALLY IN THE TRI-PARISH AREA

City of New Orleans	5,000
St. Bernard Parish	300
Jefferson Parish	3,500
City of Gretna	350
City of Westwego	150
City of Harahan	100
City of Kenner	400
TOTAL UNITS COLLECTED ANNUALLY	9,800

In a recent environmental reports on the City of New Orleans, it was estimated that some 12,000 vehicles were abandoned or "permanently" parked on the city streets. The Police Department estimated that 5,000 of these were actually junk and approximately 7,000 repairable. The Police Department indicated that with current procedures complete removal of these vehicles from the streets would require approximately four years. It is estimated in this report that the rate of accumulation of these abandoned cars on the streets of the City of New Orleans is in excess of 1000 units annually. This inventory and accumulation is over and above the number of cars removed annually by the City of New Orleans Police Department.

The responsibility for removal of autos falls on different public agencies in the various communities of the Tri-parish Area. Typical of this variation occurs in the City of New Orleans where the Police Department is charged with this responsibility, in Jefferson Parish, the Department of Roads and Bridges is responsible for removal of vehicles, and in the City of Kenner, though the responsibility was charged to the Police Department, removal was handled by private contractor until such time as it no longer became profitable to the contractor when the City started paying a fee to the contractors to remove the automobiles. However, this proved feasible for only a short period. At the present time even this subsidy does not attract haulers, having been recently estimated by local authorities that there are between 1500 and 2000 cars on the streets and private property of the City that must be removed.

The 10,000 automobiles abandoned in the Tri-parish Area are equivalent to about 7,500 tons of scrap. To this must be added a considerable number of automobiles retired from service annually in the area that are sold directly to salvage yards, thus increasing substantially the number of tons annually of scrap available from this source.

Various types of equipment have been developed and adopted for disposal or reclamation of automobiles bodies. Included in this array of equipment are scrap baling machines capable of compressing an automobile into a bale of metal of approximately an 8 cubic foot volume from its original 250 cubic foot volume, or a 96% volume reduction. Controlled incineration in large continuous flow incinerators are also available that can burn out from 100 to 200 car bodies in eight hours and hammermills that can consume an average car body in 45 seconds or a rate of 250 to 400 cars per eight hour day. Combinations of these various methods are sometimes employed to achieve the desired results.

Today's market value of the end scrap product of the hammermill method is about $30 per ton. This would indicate a potential scrap value between $225,000 and $330,000 from automobiles abandoned annually on the public right of ways in the Tri-parish Area. This volume, together with the potential value of the inventory of automobile bodies presently in the "storage" yards in the area and those delivered annually by their owners, together with oversize metal wastes generated annually, should warrant investigation by private enterprise. Local governments should jointly encourage private investors in development of reclamation operations in this field to serve the Tri-parish Area. A plant located centrally within the Tri-parish Area with facilities for water and rail shipments might well provide the means for disposal of abandoned vehicles from more distant communities, as well as having dual means of shipping the end product to domestic or foreign markets.

G. Required Tri-Parish Regulations

Upon review of existing collection and disposal practices, regulations controlling these practices and upon analyses of various disposal methods adaptable to the area, our study indicates the need to determine and program disposal facilities for the immediate requirements of the areas; such facilities to be adequate for the next decade and adaptable in the long range program to the following decade.

We have determined in the course of study that programming of these facilities may best be handled by the individual communities for the first stage development period 1970-1980 (as covered in Chapters V and VI) and on a cooperative regional program for the second stage development period 1980-1990 (as covered in Chapter VII).

In order to provide a common denominator applicable to the communities of the Tri-Parish Area, these communities need to formulate and adopt common standards, preferably under the administration of a single authority, for the control and regulation of the disposal of waste. These standards in the form of a master ordinance should incorporate by reference the recommended specifications for disposal of all types of solid wastes by methods that are acceptable to local, state and federal authorities. This authority should establish policy, administer, control and enforce the adopted regulations. Such regulations should specifically prohibit open dumping and open burning of all wastes that would present environmental hazards or any means of disposal that would contribute undesirable pollution levels to the air, water, or land.

Immediate efforts should be undertaken through such an agency as the Regional Planning Commission to sponsor an authority to formulate these standards and encourage adoption and implementation of such standards by each community as rapidly as possible with an agreement upon deadline for compliance by not later than 1980.

It would also be desirable for this central authority to provide minimum recommended standards covering other phases of the solid waste system; standards to be incorporated in the local ordinances of the various communities. Each community should retain those standards of waste collection best suited to their individual needs such as frequency of collection, number of containers, weight limitations, type of service, etc. However, basic regulations covering health standards, preparation of wastes, container requirements, violations, compliance, penalties, enforcement of ordinances, control of private collectors, disposal of special wastes, etc., should be common to all communities. In fact, it would be desirable to draw a common overall ordinance for all communities adopted by each and amended as required to suit the individual needs.

Specific standards related to waste disposal should be adopted covering operation of incinerators, sanitary landfills, as well as landfills designated for dumping of non-combustibles and oversize wastes. In the case of incineration, regulations concerning air pollution limits should be adopted, and enforcement of such regulations to be controlled by periodic stack emission tests.

IV METHODS OF REFUSE DISPOSAL

Refuse by definition is something worthless to be left or thrown aside. Traditionally man has attempted to dispose of his refuse in the least costly manner and with a minimum of effort. Only recently, as larger urban areas have developed and citizens have become aware of the hazards to public health, has more attention been given to refuse disposal.

A. Open Dumping

Open dumping has been practiced for years and is probably the oldest organized effort of refuse disposal. Generally a site for such purpose was selected at some distance from the community and frequently a scavenger was permitted to reside on the dump property in hopes that he would exercise some control over the process of dumping. Frequently, materials are delivered to the dump by the community refuse collector and by industries and home owners. In some dumps open burning is encouraged in order to reduce the volume and in hopes that such fires might reduce the quantities of garbage, thus discouraging the harboring of vermin and insects. Some years ago the open dump was the site of a rat shooting sport. Open dumps are looked on with disfavor by Public Health authorities and are being legislated out of existence in nearly all metropolitan areas.

The Tri-Parish area has agreed to discontinue this form of disposal as a condition to obtaining financial assistance from the Department of Health, Education, and Welfare, with which this study is being undertaken.

B. Hog Feeding

The feeding of garbage portions of refuse to hogs was probably the first attempt to salvage benefits from refuse. The system generally involves a program wherein the hog farmer provided for collection of selected wastes from residences, hotels, restaurants and food processing plants. Years back the hog farmer actually paid certain garbage producers for the privilege of removing their wastes. However, increased labor and transportation costs in recent years has reversed the procedure. Some time ago investigations by Health Departments determined that the feeding of such garbage to swine in many cases was detrimental from a public health viewpoint. The hogs contracted diseases and sometimes ingested parasites. Under certain circumstances the meat resulting from slaughtering of the hogs carried disease causing organisms which transmitted diseases to humans. The result of this investigation was that hog farmers were required to process the garbage by cooking before feeding. This additional processing costs money and reduces profit from this operation to a marginal level. This method has fallen into general disfavor and in Louisiana there are at least two laws which control the feeding of garbage to hogs.

C. On-Site Disposal

On-site disposal frequently includes incinerator devices installed in the structure where the refuse is generated. Many of the larger apartment houses have refuse chutes leading to flue fed incinerators and into refuse storage areas where the building caretaker finds it and feeds it to the on-site incinerator. Many industries, including food processing plants and supermarkets, are constructed with on-site incinerators for the reduction of the volume of refuse. The use of on-site incinerators is being discouraged because there is little or no control over the combustion process or the gases produced by combustion. In the absence of proper control, these gases are large contributors to air pollution and residue from improper combustion may be putrescible and require burial for proper final disposal. The installation of such devices in new construction is forbidden in a number of cities and it is expected that this method of disposal will be discouraged or materially upgraded as more rigid air pollution control standards are imposed.

Garbage grinders are also used for on-site disposal of food wastes. These installations have proven to be a popular method of garbage disposal and the number of installations is increasing rapidly in many areas.

D. Composting

Composting is a biochemical degradation of organic materials to a sanitary, nuisance free, humus-like material. Modern scientific composting has been described as a rapid but partial decomposition of solid organic waste matter by the use of aerobic microorganisms under controlled conditions. The major advantage of the process appears to be that it produces a potentially marketable and useful product. However, unless some economically beneficial use is made of the product, composting as such is of limited value as a means of municipal refuse disposal since the resulting product is equivalent to approximately 70% of the original volume of the refuse less any volume of materials salvaged.

The first full-scale European composting plant for the disposal of city refuse was begun in the Netherlands in 1932 where the refuse was composted in large open windrows without grinding or sorting. The windrow method of composting combined with the rasping system which involves grinding the refuse before the composting process is started, and turning the compost piles during a three to six week period, has become popular in Europe and by 1950, twelve plants based on this process were either in construction or use.

Between 1953 and 1956, Michigan State University conducted extensive laboratory and field experiments on the composting of municipal wastes. Numerous variables affecting the process were studiedand a pilot plant was operated for 2 years in which 45 tons of garbage per day from the City of East Lansing were processed. These experiments were based on a multiple deck silo type of digester.

Also, the United States Public Health Service initiated two research projects on composting in 1953, one in Savannah, Georgia and the other in Chandler, Arizona, near Phoenix. Considerable information has been obtained from the operation of both of these plants. The Arizona studies included the development, construction, and operation of a 10-ton-per-day experimental plant at Chandler in which aeration, bin and windrow composting were used.

In 1956, a 100 ton-per-day composting plant was placed into operation at McKeesport, Pennsylvania. This plant operated for about a year and was subsequently closed. More recently the plant has been dismantled and we understand it has been installed at Kingston, Jamaica, where it is again in operation, intermittently.

A visit to the S.A.C. compost plant in March 1967, located in San Fernando, California, revealed that this plant had been shut down for about two years because of inability to find a market for the end product.

A visit in July 1966 to the 150 ton-per-day compost plant in St. Petersburg, Florida, indicated that contracts had been obtained with growers for taking the compost directly from the windrows; however, another visit in September 1967 revealed that except for limited quantities sold in bags to hardware stores, most of the compost has been disposed of by dumping. Also serious odor problems have plagued the plant, causing it to be shut down in 1968.

Recent inquiries to Mobile, Alabama, indicate that the lack of a market for the end product is the greatest problem in the operation of that City's new 300-ton per day composting plant.

Houston, Texas, awarded three contracts for compost plants and one for an incinerator in April 1966. One compost plant was completed and commenced operation in the spring of 1967, a second plant was completed but not placed in operation because of complaints by neighbors of odors. The Contract for the other compost plant was cancelled.

The most recent compost plant to be placed in operation is the 160-ton per day plant at Gainesville, Florida which receives the refuse from the City of Gainesville and the University of Florida. This plant was constructed by the same company that is operating the plant at Houston, Texas. Operating costs for a plant of this size were estimated by its operators on an annual and per ton basis as shown in Table IV-1.

TABLE IV-1

COMMERCIAL VENTURE - COMPOST PLANT
(160 T/D - 50,000 tons Annually - Capital needs $1,500,000)

	Rate Per Ton	Amount
Operating Costs:		
Labor and payroll expense	$3.28	$164,000
Utilities	.42	21,000
Supplies	.40	20,000
Repairs	.50	25,000
Travel	.04	2,000
Telephone	.12	6,000
Equipment rental	.03	1,500
Licenses and fees	.02	1,000
Consultants	.05	2,500
Contract hauling	.26	13,000
Total Controllable Expense	$5.12	$256,000
Insurance	.20	10,000
Land rental	.12	6,000
Property taxes	.20	10,000
Legal and audit	.09	4,500
Management fee	.60	30,000
Franchise taxes, start-up expense, etc.	.20	10,000
Total Non-Controllable Expense	$1.41	$ 70,500
Total Operating Expense	$6.53	$326,500

	Rate Per Ton	Amount
Depreciation or Debt Service:		
Note: Debt service - $1,200,000 at 6 1/2% for 20 years equals $107,424 per year; depreciation on $1,250,000 at 8% annually is $100,000. Capital needs include some working capital, which are not depreciable	$2.15	$107,500
Total Operating Expense	$8.68	$434,000
Less Credits for:		
Sludge	$ .10	$ 5,000
Metal and paper salvage	1.30	65,000
Compost	2.00	100,000
Total Credits	$3.40	$170,000
Net cost for 50,000 Tons	$5.28	$264,000

The net cost of $5.28 per ton is predicated upon finding a market for the compost produced from 50,000 tons per year of refuse. A recent study make for Riverview, Michigan, covering an estimated population of 319,970, by Johnson and Anderson, Inc., Consulting Engineers, had the following to say regarding the marketing of compost:

> "This study of the possible uses of refuse compost from a manufacturing facility located in lower Michigan indicates the presence of a specialized market probably large enough to absorb 25,000 tons annually of compost out of an annual production of from 25,000 to 44,000 tons from the Riverview plant, provided that there is no immediate development of additional compost manufacturing capacity in the Ohio-Michigan region."

The City of Gainesville together with the University of Florida has about one quarter of the population of the Riverview Study Area.

The estimated operating costs for the proposed Riverview Plant are shown in Table IV-2.

TABLE IV-2

RESUME OF COSTS AND INCOME FOR A 300-TON (REFUSE) PER DAY COMPOSTING PLANT

ITEM	COST PER TON OF REFUSE		
Capital Costs		$2.88	
Operating Expenses		5.12	
TOTAL PRODUCTION COST		$8.00	
Other Costs			
Disposal of 70 Tons of Compost Per Day in Nearby Landfill	$0.47		
Disposal of 70 Tons of Compost Per Day transporting 200 miles by rail to land reclamation area			$1.40
GRAND TOTAL COSTS	$8.47		$9.40
Income			
Salvageable Material		$3.50	
Compost Sales		3.24	
TOTAL INCOME		$6.74	

The net cost per ton of $1.73 and $2.66 respectively depends upon obtaining an income of $6.74 per ton from the sale of compost and salvageable materials or about twice that estimated for Gainesville.

In commenting on the history of composts plants in the United States, Johnson and Anderson, Inc. have the following to say:

> "1. Aside from some Technical Difficulties, the Principal Cause of Failure has been Economic.
>
> "With few exceptions, the plants that have shut-down were operated by private businessmen who expected to realize a profit, balancing

the cost of processing refuse into compost against a fee charged to the city plus proceeds from the sale of the compost. Ideally, the amount charged the city for each ton processed would pay for plant operation, and compost sales would provide the profit.

"It has not worked out that way. Generally, the fees paid by municipalities to plant operators for each ton of refuse processed range from $1.00 to $5.00, while the cost to process a ton of refuse is between $5.00 and $10.00.

"Running a deficit, the operators looked belatedly inro the marketing of compost. Still believing that there was a wide requirement for the commodity, they tried to sell it to the people they thought had the greatest need for humus; farmers. They were, except in Florida, usually disappointed. The market was not there.

"2. Compost Plants have Failed because of Technical Difficulties and Poor Location, even before Encountering the Marketing Problem.

"The main complaint in most start-up operations is the unsuitability of many items found in city refuse for hammermill and grinding operations. Large objects, usually metal, have caused extensive damage to the machinery and long down-time. The designers then consider procedures or machines to detour "tramp" metal, paper and other items having salvage value.

"Another factor, one which has a new plant in Houston closed at the moment, is poor location. Despite all claims to the contrary, there is an odor from compost and from compost plants, especially in warm, humid weather. There is a temptation to relocate the plant at the end of a refuse pick-up line, even though that location may be in a residential area. Whether for real or imagined reasons, people do not like to have refuse or sewage plants in their neighborhoods. The Houston plant, one of two built recently, was placed in a better-than average residential area not far from a house of worship. Five hundred residents have signed a petition to have it moved.

"In short, composting plants built over the past seventeen years generally have not been successful. Many have not proven to be economically feasible. Several have had technical difficulties and a poor

> location is a problem to at least one new plant. Those that have succeeded have done so principally because of successful compost marketing efforts."

To the above comments we should like to add that all compost plants in the United States with a successful history of operation of five years or more were of less than 50 tons per day capacity and the compost produced was for a special and limited market. Concerning the market in the Riverview area, Johnson and Anderson, Inc. comment as follows:

> "Riverview and the other towns that would participate in the use of the proposed plant are relatively small in comparison with nearby Detroit and its larger suburban communities. The marketing opportunities that we believe do exist for a quantity of about 25,000 tons of compost annually will be sharply altered if parallel plans for compost plants are endorsed by the Federal government within this region which, for marketing purposes, must include both Michigan and Ohio.
>
> "If, on the other hand, the disposal problem becomes too acute in the area to be concerned with the development of end-product sales for one plant so that it becomes self-supporting, then, we believe, compost may have a final virtue.
>
> "Our findings indicate that it would be difficult to give compost to nearby farmers. They do not appear to want it, free or otherwise. Making it free to local citizenry in small amounts does not seem a practical means of moving large amounts of compost continuously.
>
> "However, compost making does reduce refuse volume substantially, and in an area saturated by over-production this may be an advantage if the final plan is to use the compost in landfill and soil reclamation projects some distance from the plant.
>
> "It may be necessary to add a compacting operation to achieve greater density, but sanitary landfill may be both a supplement to current marketing efforts and a future (5 to 10 years) alternative as other communities enter the program."

Advantages*

1. A composting plant produces a usable end product that may be sold, thus either paying for, or at least reducing, costs.

2. Composting can be used to dispose of many industrial wastes such as those from meat packing plants, paper mills, saw mills, tanneries, stockyards, and canneries; also dewatered sewage solids, especially if they are mixed with ground refuse; and cans and bottles that have no salvage value can be economically ground with the remaining refuse.

3. Normally composting offers favorable conditions for salvage of rags, glass, cardboard, paper, cans, and metals.

4. A well located refuse composting plant may reduce the cost of hauling refuse to the point of disposal.

5. Flexibility of operation permits a 100 to 200 per cent overload in design capacity for several days by increasing the time the receiving bins and grinders operate.

Disadvantages*

1. Capital and operating costs are relatively high.

2. Whether the end product can be marketed is not yet proven and seasonal use of the end product may require special marketing procedures or extensive outdoor storage.

3. Trained personnel to operate composting plants are not readily available.

4. Refuse that damages grinders must be removed and disposed of separately such as tires, pipes, heavy stones, mattresses.

5. If cans and bottles have no local salvage value they must either be removed and disposed of separately or ground with the organic matter, thus somewhat reducing the quality of the finished compost.

6. Site procurement for a composting plant is difficult.

*From Municipal Refuse Disposal, A.P.W.A.

Although composting plants continue to capture the imagination of the public, particularly those who are conservation minded and a number of plants have been built, none of those constructed and presently operating in the United States have a capacity sufficient to be seriously considered in the present study.

We have considered the possibility of constructing a small compost plant sized to meet the needs of the various Parks Departments within the City. The conservation of the parks, parkways, and gardens within the City is divided among the following agencies, each of which we have contacted: the City Parks Department, the Department of Streets; the New Orleans Recreation Department; the New Orleans District Levy Board; the Parks and Parkway Commission; and the Audubon Parks. In general, we find that river sand is used almost exclusively for lawn and garden dressing by each of these Departments. In almost every case, the organic matter required is obtained from the operation of compost piles maintained and operated by the Departments using cuttings and other materials from the Departments' operations as the raw material. In the case of the Parks and Parkway Commission, records indicate that some 240 cubic yards of organic muck material was purchased.

As shown by the above, there is no demand in any of the Parks Departments for compost material such as might be manufactured from the City's refuse.

E. Incineration

A modern municipal incinerator must meet a number of basic design requirements. It must be free of public nuisance. Neither air pollution, water pollution nor ugly appearance is permissible. It must be economical to own and operate. It must be dependable in its operation and be able to process a maximum variety of solid waste.

Avoidance of public nuisance is of prime importance since the principal reason for the existence of an incinerator is to dispose of a public nuisance--solid waste or refuse. In our rapidly expanding metropolitan areas, it is safe to assume that, regardless of the remoteness of the incinerator site selected, there will be tax-paying neighbors nearby during some part of the life of the plant. Consequently, incinerator design must provide extremely close control of air pollution to prevent dust fallout and unpleasant odors or fumes in neighboring areas. Air pollution code restrictions have become increasingly stringent in recent years and it seems most appropriate for publicly owned and operated facilities to be models of good performance in this regard. Recognition and acceptance of the need for very low stack emission rates has a marked effect on the design of incinerators.

Mechanical developments in the last several years since the advent of more stringent air pollution control regulations, which have demanded a high degree of efficiency, have now made it possible to construct incinerators requiring a minimum of operating personnel and capable of functioning without smoke or other stack emission while producing a completely burned-out residue which can be disposed of without nuisance or the need for burying.

Such incinerators are good neighbors and can be built in any area zoned for industry or commerce without blighting the surrounding area or causing complaints from adjacent property owners.

Advantages *

1. Much less land is required than for disposal in landfills. If there are insufficient sites available for landfills within economic haul distances, incineration may be the most economical method of disposal.

2. A central location for an incineration plant is possible. A carefully operated plant in a well-designed building that has well-landscaped grounds is acceptable in many neighborhoods, and so site selection is not as difficult as it is for some other disposal methods. A location near-central to tributary collection areas reduces hauling costs.

3. An incinerator can produce ash residue that contains a negligible amount of organic materials and thus is nuisance-free. The residue is also acceptable as fill material.

4. The modern incinerator can burn a good many kinds of refuse. It can efficiently burn combustibles to ash and can even reduce the bulk of the non-combustible components of mixed refuse.

5. An incinerator is not affected to any degree by climate or unusual weather.

Disadvantages

1. Large capital investment and high operating costs.
2. Difficulty in securing a site because disposal operations in any form are offensive to many people. Moreover, truck traffic to and from the plant may be considered a hazard and a nuisance, particularly in residential neighborhoods.
3. Not a complete disposal method. Ash and other residue from the burning process, including fly ash, must be disposed of by other means.
4. Inability to handle bulky and industrial waste.
5. Requirement of trained personnel.
6. Necessary to treat and dispose of quench and scrubber waters, and possibility of air pollution.

F. Other Processes for Reducing Waste with Heat

Considerable research into modifications of the generally recognized incinerator process has been undertaken. Twosuch projects are worthy of mention.

1. Melt-Zit Process

The American Design and Development Corporation of Whitman, Massachusetts, has been developing the Melt-Zit Process. The literature on this process makes it sound very attractive. The technical details were unavailable and it was not possible to see the existing experimental 100-ton per day unit in operation. This process requires auxiliary fuel and it is reported that coke is used at the rate of 1.0 ton per 40 tons of refuse. This unit does not utilize grates and is presumed to be a form of blast furnace which uses a refractory lined column into which the refuse is fed. Temperatures in this zone are maintained at approximately 3,000°F. Such temperature results in the melting of the glass and metals to produce a melted pool of residue. The pool is drained into a quench tank where the rapid chill results in production of a granular material. It is reported that the weight of residue is approximately 3% of the weight of refuse treated. This very high reduction in weight is especially attractive in areas where residue disposal is a problem and can be a substantial element of cost.

The cost of auxiliary fuel, together with the maintenance of the high temperature refractory lining of the furnace make this process inherently more expensive than the normal incineration process and thus its use can only be justified where residue disposal is a serious problem. In the case of New Orleans, a well burned residue from a modern incinerator which is a high quality fill material is in demand, and the considerably larger volume of residue produced under normal conditions is an advantage rather than a detriment.

The development of refractories for such high temperatures is relatively new and no data has been obtained on the service life of the refractory. The Federal Government through the Department of Health, Education, and Welfare has approved a grant. The objective: "To investigate and evaluate the Melt-Zit high temperature pilot incinerator at Whitman, Massachusetts..."

The Melt-Zit Process appears to have a great deal of potential for future application. However, there is presently no such process in use on a community basis and there are no evaluating data available from independent concerns on which definite conclusions may be based.

Because of the still experimental nature of this process at this time, as well as for the reasons stated above, this process should not be considered for the New Orleans area.

2. Pyrolysis

The City of San Diego, California, is experimenting with another process for the reduction by heat of municipal wastes. This process is described as pyrolysis. Pyrolysis amounts to destructive distillation. Destructive distillation is accomplished by heating the material to be subjected to distillation in a container with suitable vents. The products of destructive distillation include hydrogen, carbon dioxide, carbon monoxide, methane, ethylene, ethene and other gases. The gases produced can be burned with an expected heating value of 300 to 400 BTU per cu. ft.

Other products of destructive distillation which escape through the same vents and can be condensed, are termed pyroligneous acids. Although the pyroligneous acids can be expected to contain 70 to 80% water, the remainder will be a variety of alcohols, ketones, tars, and organic acids. It is expected that these materials can be separated and sold. The char resulting from this method contains substantial amounts of inert materials such as metal and glass and has a heating value of approximately 11,000 BTU's per pound. Experimental work indicates that this process can be self-sustaining.

This process has been developed in the southern California area where because of smog conditions air pollution is critical and cost is of secondary importance. Such a process cannot be expected to compete economically with normal modern incineration except under special circumstances which do not exist in the New Orleans area.

For these reasons, as well as the experimental nature of the process, we do not consider this method suitable for use in the New Orleans area.

G. Landfill

Landfill is required for the ultimate disposal of residues from all refuse reduction processes as well as for the disposal of such wastes as are not amenable to reduction. Proper refuse disposal recognizes two types of landfill, namely: The sanitary landfill, which is treated at length in a subsequent section, and the landfill which is limited to the disposal of non-putrescible, non-incinerable waste materials such as demolition and construction wastes, oversize wastes, ash, incinerator and industrial residues, and similar materials that form satisfactory fills and do not require the use of cover material or special precautions to prevent the development of health hazards. Landfills of this type can be undertaken with a minimum of precaution in most low areas requiring fill material for their proper development and subsequent use of the area need not be limited. This type of landfill must form a part of the planning in every refuse disposal program.

H. Sanitary Landfill

This method was developed in the United States early in the 1930's when disposal of refuse by dumping in open areas, due to the offensive nature of refuse, had created conditions in most cities that were unsatisfactory to all. It consists of dumping of refuse in a selected site in which the refuse is compacted in cellular construction and covered at least once a day with a layer of earth that is also compacted to provide a tight seal.

During the early part of World War II, military installations, faced with ever increasing quantities of solid waste, adopted this method of refuse disposal at many camps and other installations. It was soon adopted by many municipalities across the nation, so that from less than 100 cities using it in 1945, more than 1,400 cities had adopted it by 1960. More recently, however, the method had to be curtailed in a number of large cities including New York and Baltimore because of the lack of suitable sites within economic haul distances and because of the need to preserve the sites for other uses.

Sanitary landfill operations may be classified into three categories: The Trench, the Area, and the Ramp methods. The method selected is usually dictated by the topography of the site and characteristics of the soil.

Regulations and recommendations of state and federal health agencies have done much to improve the operation and upkeep of the landfill sites. Few so-called sanitary landfills, however, meet the recommendations of the United States Public Health Service.

Advantages

1. A well designed and efficiently operated sanitary landfill can meet all the requirements of public health standards.

2. If adequate land with suitable cover material is available at a reasonable distance from the collection center relatively low capital investment and operating cost will result.

3. Unlimited as to kind or type of refuse that can be accepted for disposal.

4. Limited number of skilled personnel required for operation.

5. Unlimited capacity for emergency conditions.

6. Improvement of property for limited use after fill is completed, such as play areas, parks, athletic fields, parking areas, etc.

Disadvantages

1. Usually located at considerable distance from the geographical centers of the collection area so that hauling distances are long, thus resulting in a higher overall cost of refuse collection, not to mention the effect of delays and emergencies, particularly during inclement weather.

2. Under certain conditions, contamination of the ground water or surface waters has occurred particularly where refuse is dumped into pits, quarries and depressions that extend below or close to the water table which permits the leaching of contaminants.

3. Limited use of the completed landfill area.

4. Explosion hazards due to lateral passage of decomposition gases to adjacent areas.

I. Transport of Waste by Barging

Investigation of factors affecting the feasibility of barging wastes, included determination of routings, distances, equipment, and time factors, as well as consideration of weather factors and methods of preparation of wastes prior to shipment. Policies of the various governmental agencies must also be considered in evaluation of the methods of disposal, such as burning and/or dumping at sea. Investigation of these latter methods were specifically requested by the City of New Orleans.

1. Route Distances

The principal routes considered for waterway transfer include the Mississippi River, the Gulf Outlet Channel, and the Intracoastal Waterway.

Maps and charts of these waterways indicate nominal distances ranging from 80 to 120 miles (one-way) from the Mississippi River Bridge in downtown New Orleans to open Gulf waters. These route distances shown in Table IV-3 include a ten-mile allowance beyond the mouth of the outlets into open waters

TABLE IV-3
WATERWAY TRANSPORT ROUTES

Route	Nautical Miles
Via the Mississippi River	
Southwest Pass	120
South Pass	114
Pass Loutre	118
Tiger Pass (proposed)	105
Via the Gulf Outlet Channel	80
Via the Intracoastal Waterway and Lake Borgne	80

2. Speed and Haul Time

Discussions with experienced and knowledgeable parties in barge transport on the Mississippi River discloses average towing speeds of five knots (round-trip basis) should be contemplated for the time and size of cargo to be transported. With this speed, an elapsed roundtrip haul time to open waters varying from 32 to 48 hours must be allowed, depending on the route selected. Allowing additional loading and discharge time would immediately indicate the need for three sets of barges and the availability of additional tug units for a reliable system.

It should be noted that multiple barge units in tow may be allowed in inland waterways, but generally, only single units in tow are permitted on the open sea. It follows, that small barges towed in a group to the mouth of the River or other outlets would then require individual shuttling a distance of approximately ten miles for discharging cargo. At five knots, each unit would require about four hours for the roundtrip.

3. Equipment Requirements

Preliminary discussions indicate that the tonnage and volume requirements for one day's production of refuse (assumed at 600 tons per day) as received at a single transfer station, could be incorporated in a single barge with special design features for burning or unloading at sea. Assuming that natural compaction of this material in loading would achieve a density of about 300 pounds per cubic yard, or say, six cubic yards per ton, the magnitude of this load would be comparable to a net cargo space (volume) of approximately 50' x 165' x 12' depth. Local opinions are that barges for this particular purpose would necessarily be of special design and limited in use for other purposes. Should grinding or shredding of refuse be performed at the transfer station thereby reducing volume, much smaller barges would be required, but higher preparation costs would be incurred.

4. Weather Factors

Considerations for employment of barge transport of waste for disposal should also include evaluation of weather factors that affect the reliability of this means of transport. The frequency and hours of duration of fog and storm conditions that slow or close navigation of the inland and open waters are unpredictable conditions that would affect the reliability of the system. Statistics are lacking on these conditions. However, indicative of the problem is the Corps of Engineers records of heavy fog in the immediate vicinity of New Orleans during 1965, 1966, and 1967. For these years, fog slowed or closed river traffic as follows:

37 days in 1965
28 days in 1966
43 days in 1967

It averaged 33 days per year over the past 19 years with the normal occurrence during the five month period from November through March.

Local shipping operators indicate modern sea-going tugs with radar navigational equipment are generally all-weather craft, and continue operations regardless of weather, except for severe storm conditions. A reliable transport system would require properly equipped craft. Costs of this type of equipment, of course, are extremely high. Preliminary indications of contract costs for tugs capable of furnishing this service range up to $900 per day.

5. Policies of Governmental Authorities

Extremely important and perhaps the deciding factors against dumping or burning at sea are the probable unfavorable reactions of state and federal governmental authorities (due to indicated violation of their policies).

These governmental authorities concerned with and/or previously ruling on the utilization of inland waterways and offshore waters include the U. S. Supreme Court, the U. S. Public Health Service, the State Board of Health, the U. S. Coast Guard, the Corps of Engineers - U. S. Army, State Stream Commission, Wildlife and Fisheries Commission, the tourist agencies of Lousiana communities and communities of adjacent coastal states.

Specific obstacles against dumping at sea may be cited in a U. S. Supreme Court Ruling of 1933. Prior to this time, dumping refuse at sea was a fairly common practice of various coastal cities in the United States. In this Ruling, the Supreme Court prohibited this practice in a decision involving New York City. At the time, New York faced court action initiated by coastal cities in New Jersey to force cessation of dumping its refuse at sea. The Supreme Court upheld a ruling requiring that New York City cease this practice due to its effect on the neighboring communities and resort areas in the coastal region.

Although Louisiana has no major coastal resort cities or heavily populated communities in the coastal region, the resort areas of neighboring states would in all likelihood be affected by waterborne deposits of refuse, resulting in contamination of the Gulf beaches.

Deposits of this waterborne debris could also be expected in the relatively shallow coastal waters, thereby contributing to their pollution. Health authorities, the Wildlife and Fisheries Commission, and representatives of the commercial fishing industry are continually striving to minimize the dangers of pollution in inland and coastal waters. Hundreds of square miles of comparatively shallow inland waters and marshlands parallel the coastal areas of Louisiana as well as the coastal areas of adjacent states, and currently provide highly productive fishing grounds for the commercial shellfish and fishing industry.

The U. S. Coast Guard and Corps of Engineers among their many duties, are highly concerned with maintaining minimum navigational hazards on inland and coastal waterways. The discharge point of unloading large volumes of refuse at sea would be subject to control to eliminate drift of masses of material into navigable channels. Burning at sea or in inland waters would also be subject to their control. Unofficial recommendations indicate that dumping of this daily volume and type of material should not be permitted in less distance than a 24-hour run to sea.

The Coast Guard, Stream Commission, and the Corps of Engineers jointly would prohibit dumping or burning refuse in or near the principal inland waterways due to pollution and navigational hazards.

Formal and joint application to all agencies affected would be required in pursuing this means of disposal. It would be highly unlikely that approval could be obtained from all agencies. Assurance that approval would be granted or guaranteed for a sufficient period to amortize investment requirements is even more unlikely.

6. Summary - Transport of Waste by Barging

In this area, barging of wastes for final disposal appears to be a highly undesirable and unreliable method of disposal. Distance and time, together with the unpredictable weather factor alone, rule out serious consideration of this method. With consideration of the rightful emphasis placed on pollution controls (of air, water, and land) by governmental authorities, disposal by dumping at sea and especially in inland waters today is in direct violation of the aims of the pollution control program.

Based upon the factors detailed above, economic evaluation for barging to sea is not considered warranted.

Barging to inland locations for disposal by sanitary landfill was considered as an alternate method for utilizing water transport. Preliminary investigation indicates this method of handling would not be economical. Based upon a 50-mile one-way haul to a site that would be suitable for sanitary landfill operations, costs of $5.50/Ton were estimated, allowing $1.00/Ton for transfer station costs (loading), $1.50/Ton for unloading and transport costs at the landfill site and $1.50/Ton for the sanitary landfill operation. Excessive rehandling costs are unfavorable in this method. Further, unpredictable weather factors contribute to the unreliability of this method of transport of solid wastes. Although some barging of wastes has been practiced by some coastal communities in the past, consideration for this method of disposal for the Metropolitan New Orleans area appears to have no merit in the foreseeable future.

J. Special Preparation of Refuse for Disposal

The light weights and low densities of many types of wastes have resulted in large volumes to be transported and at relatively high cost per ton. Likewise, these wastes, because of their low densities occupy large initial volumes in landfills and are subject to a high degree of settlement.

Numerous efforts have been made to consolidate these wastes in order to reduce the cost of transportation and the space required at the disposal area. A considerable amount of experimental work has been done in both shredding and compacting refuse as a means of reducing its volume, and full scale installations of both types of equipment have been made outside of the United States.

1. Shredding

One of the more common uses today is for shredding automobile bodies and preparing the material for scrap. Experiments have been carried out using the same type of equipment which have shown that the volume of refuse can be reduced to about one-fifth with a corresponding increase in density, thus reducing the cost of transportation from the collection points to the disposal site. The increase in density reduces the subsequent settlement in a landfill and lessens the amount of cover material required. Also, the shredding changes the appearance of refuse, so that areas may be filled with shredded refuse which otherwise would be unacceptable to the general public and neighbors in the vicinity.

Shredding is also particularly useful for the reduction of volume of garden trash, oversize waste, and other materials for which disposal is currently a problem, either at incinerators or on landfills.

Economic studies by the authors covering garden trash in the Miami area have shown that savings in transportation costs due to increase in density can be greater than the cost of installing and operating a shredding plant. Several special types of equipment have been developed for this purpose. It is believed that this type of waste processing will come into more general use as transportation to more distant areas becomes an important factor in the cost of refuse disposal. However, the limitations on the use of sanitary landfill in the area would still be applicable and shredding on a large scale is not indicated at this time.

2. Grinding

The grinding of garbage and other putrescible wastes, either in home units or conveniently located central stations for disposal of the ground material into the sanitary sewage system has become increasingly popular since its introduction about 30 years ago. Locally, a comprehensive study undertaken by Godat & Associates for the New Orleans area in 1952 recommended against grinder discharge into the river or sanitary sewers. Today, increased use of home grinders is occurring in the new areas of development and is expected to increase further with proposed improvements in the sanitary sewerage systems. However, the findings of this earlier report against discharge from central stations into the river are still valid, for conditions have not improved materially in the intervening years.

3. Compaction

Large hydraulic presses have been in use to process car bodies into blocks which can be shipped as scrap to the steel mills. Recently, processes have been developed utilizing this type of equipment for compressing refuse into a small volume for its transportation and final disposal. The Tezuka Kosan Co., Ltd., of Tokyo, Japan, has developed a refuse compressing system which we have studied based upon their literature.

Briefly, the process involves a reduction in volume by the use of hydraulic pressure in order to obtain a final specific gravity of the compressed refuse in the order of 1.2 and 1.9 and it is our opinion that the final specific gravity of the resulting cube or bale is a function of the nature of the refuse, as well as the nature of the cover which is added to the finished bale. The finished bale can be enclosed with chicken wire and hot asphalt, chicken wire and Portland cement concrete, chicken wire and vinyl, chicken wire or iron strap only, vinyl only, iron sheet or unconfined, depending on the final disposition of the material.

It appears that this is a modification of the process being used in Mobile, Alabama, in that, by the Tezuka process, no effort is made to sort the refuse or to salvage any materials, whereas in Mobile, non-compostables are removed prior to the baling process. The literature from Mobile and from Tezuka are completely contrary to each other in that according to the Mobile, Alabama Process the material after completion of the cubes undergoes anaerobic decomposition with the resulting formation of a compost. The literature from Tezuka makes a claim that the materials, once baled, will not decompose (corrode) and that due to the absence of oxygen, the propagation of micro-organisms is prevented.

The Tezuka Process proposes to use the finished product as landfill and claims that it is particularly well suited to underwater filling. The Tezuka literature indicates that the cost of baling will be in the range of $2.50 to $3.50 per ton, and since these calculations appear to be a conversion from the predicted cost in yens on the Tokyo basis, the reliability of the estimate is questionable. Furthermore, the estimate does not provide for debt service. It is quite possible that, with debt service the cost may reach $6.00 per ton or more. Also, the literature indicates the need for much power. As of December 29, 1967, a news release indicates that no plant of this nature is in service and that the first installation is scheduled for Kofu, a City northwest of Tokyo. This process produces a liquid waste which Tezuka apparently proposes to treat by the activated sludge process. It is our opinion that this process is still experimental and should not be considered for this project at this time.

K. Applicable Methods of Refuse Disposal

In the foregoing we have discussed the various methods of refuse disposal and where possible have indicated the relative advantages and disadvantages of each. Of these various methods there are several that should be singled out for further discussions as applied to the refuse disposal problem in the Tri-Parish area. These include composting, central incineration, landfill and sanitary landfill.

1. Composting

This method can be expected to convert the refuse into about 70% of the equivalent volume of the raw refuse less any materials that may be salvaged. The finished product is a humus-like material very similar to the organic muck covering much of the Tri-Parish area so that little market can be expected locally for this product in competition with the abundant supply of natural material.

2. Central Incineration

Since the construction of the first incinerator in 1916, central incineration has been the preferred method of refuse disposal in the Tri-Parish area. Although capital and operating costs for this type of plant are higher than those required for sanitary landfill operations, they are well located within their respective collection districts thus reducing transportation costs to a minimum. Also the increase in disposal capacity required through 1980 can be largely accommodated by enlarging and rebuilding the presently obsolete plants to modern standards on existing sites.

Details required to carry out the program of enlargement and modernization together with records of operation and maintenance cost for the existing plants as well as estimates for those proposed are included in subsequent chapters where they are discussed in detail.

3. Landfill

Landfill areas must be a part of any refuse disposal program. There is need for filling much of the land in the Tri-Parish area prior to its development so that obtaining convenient sites for this purpose presents no problem and areas need not be reserved in advance for this purpose.

4. Sanitary Landfill

The swampy terrain in and around the Tri-Parish area would require extensive diking, drainage, or filling before a sanitary landfill could be constructed without danger of either contaminating the ground water or the surface streams. Contamination of these streams by leachates from sanitary landfills has been found to upset the ecological balance which could adversely affect the marine life including bivalves, shellfish, and fish, all of economic importance to the area.

A preliminary report on environmental conditions prepared recently by the City Planning Commission of New Orleans with their consultants, emphasized the characteristics of the Mississippi River delta lands in and adjacent to the City of New Orleans as follows: "Characteristics of the alluvial deposits include generally high water tables and low load bearing capacities of the soil. The majority of the area has a ground surface elevation less than the mean delta level with water tables within a foot or two of the surface requiring surface and storm drainage via a system of pumping stations. Subsurface soil composition is characterized by an overlayer of natural humus some 20 feet in thickness consisting of a combination of organic sand and peat. The underlayer of this strata is lined with soft gray clays, silt, and fine sand with the distribution of sand layers at very irregular pattern depths and locations."

These soil characteristics limit the depth of fill that can be placed in a given area without foundation failure and the lateral movement of the underlying soils. Such failures have already been experienced in certain of the open dump operations. Because of the limited bearing capacity of the soils in this area, the Louisiana State Highway Department follows the practice of limiting the height of embankments to 4 feet. Bridge approaches and other structures which would normally require a greater depth of fill are constructed with pile bents and unsupported concrete slabs, at considerable additional cost. Recently, on interstate construction where highway grades are generally maintained several feet above that of the surrounding terrain, practice has been to excavate all peat and muck and to refill with river sand. This preparation to ensure stable embankments, which has required an average of more than 20 feet of excavation and fill, has greatly increased the cost of highway construction in this area. This condition extends throughout most of the Mississippi River Delta land in Louisiana as is evidenced by recent soils investigations undertaken by us for the Baton Rouge Incinerator, which showed a limiting depth for fills in that area of not more than 10 feet in order to avoid failure of the subsurface strata. A map showing the soils classification in the Tri-Parish area has been included with this report (backcover of Appendix).

In view of these conditions we have found it necessary to limit the depth of fill for a sanitary landfill to a maximum of about nine feet including both refuse and cover material especially in the lower areas. Although the higher and better drained areas might support a somewhat greater depth of fill, the limited amount and high price of such areas would preclude their use as sanitary landfills even though they may be dedicated to park purposes.

Also the humus type of soil which is subject to cracking on drying is not suitable for use as cover material in a sanitary landfill. The only available material which could be used for this purpose would, therefore, be river sand which is dredged commercially from deposits in the river and sold generally throughout the area at a price of about $1.50 per cubic yard.

In summation we find that the need for diking and draining the site, the limiting of the depth of fill and the need for purchasing cover material each add to the cost of this method of disposal in the Tri-Parish area and make it less competitive than is frequently the case.

In order to further evaluate this method of refuse disposal we have selected two possible areas within Orleans Parish where a sanitary landfill might be developed. One is on the land lying between the parish boundary and the Intracoastal Waterway between Paris Road and the Industrial Canal. This land is controlled by the Dock Board and is being reserved for future industrial development. The other is at Blind Lagoon in the Chef Menteur area where 500 acres are presently preserved for park purposes. No specific inquiries have been made as to the availability of either site for use as a sanitary landfill.

Both of these sites are low and must be diked, drained, and pumped to be maintained in a dry condition during placing of the waste material and maintained watertight afterwards to prevent contamination by leachates of the surrounding waters. Also sand for cover must be imported.

In determining the cost of waste disposal by sanitary landfill we must consider not only the cost of operating the landfill, but also the additional cost of transporting the waste from the present collection districts to the landfill. Such waste can either be transported directly in the collection vehicles or if the distance becomes too great, these vehicles can deliver their loads to a transfer station and larger transfer vehicles be used to haul the waste to the disposal site. Since the incinerators presently serving the City are centrally located in each of the refuse collection districts, we have considered the additional haul distance from each of these incinerators to the proposed landfill site as a part of the cost of sanitary landfill.

In the following text we have made a brief analysis of the cost of refuse disposal by sanitary landfill.

In order to arrive at comparative cost figures we have made the following calculations, based on a selected daily quantity of 600 tons of waste, with compaction to a density of 1,000 pounds per cubic yard, layered in two-foot depths with six inches of cover material on each of three lifts and a final topping of 18 inches of cover material.

We have selected a 600-ton/day landfill for the cost analysis, since we consider that this size operation represents the work that can be accomplished daily with one set of spreading and compacting equipment. This, therefore, represents the minimum cost of operation since a larger landfill will require more equipment and additional crew with correspondingly greater costs.

Table IV-4 illustrates daily and annual requirements of acreage and cover materials.

TABLE IV-4
REQUIREMENTS FOR LAND AREA AND COVER MATERIAL

	Daily	Annually
Tonnage of Waste	600	187,200
Acreage Required (9 sf/ton)	.125	39.0
Compacted Cover Material	600 CY	187,200 CY

Based on these factors, one acre of land will accommodate eight days waste production (4,800 tons) and require 4,800 cubic yards of compacted cover material which is equivalent to about 6,000 yards of loose cover material allowing 20% for compaction.

The minimum cost per cubic yard of sand to be used as cover material delivered within a 5-mile radius of its source would be about $1.50. This at the Dock Board site would probably give a cost of about $1.70 per cubic yard and at the Blind Lagoon site we have assumed the same price. The minimum per ton cost for placing, spreading, and compacting waste material is estimated at about $0.30 with an additional cost of about $0.20 per cubic yard for spreading and compacting the cover material.

Preparation of these marshland sites would include a required levee and dewatering system to provide suitable ground conditions for equipment operation. Cost of these improvements, together with provision of surface drainage, road construction within the work area, fencing, water supplies, and required structures, excluding cost of land or access roads and based on minimum development of 100 acre plots, are estimated to range from about $1,750 to $2,000 per acre or about $0.35 to $0.40 per ton of waste handled.

Combining the above cost factors, Table IV-5 illustrates that the minimum cost of working 600 tons of waste per day at sanitary landfill will be approximately $2.58 per ton, excluding cost of land.

TABLE IV-5
ESTIMATED MINIMUM OPERATING COSTS OF DISPOSAL
BY SANITARY LANDFILL

Item	Per Ton of Waste
Site Preparation	$ 0.38
Spread and Compact Waste	0.30
Spread and Compact Cover Material	0.20
Cost of Cover Material Using River Sand	1.70
Estimated Minimum Working Cost	$ 2.58

We have also determined that a 60-cubic yard compactor trailer similar to that presently used by the Sanitation Department would be required for transfering refuse from the transfer station to the sanitary landfill. The cost of operating these units including the cost of the driver is shown in Table IV-6.

TABLE IV-6
TRANSFER TRAILER OPERATING COSTS
(60-Cubic Yard Compactor Trailer with Tractor and Operator)

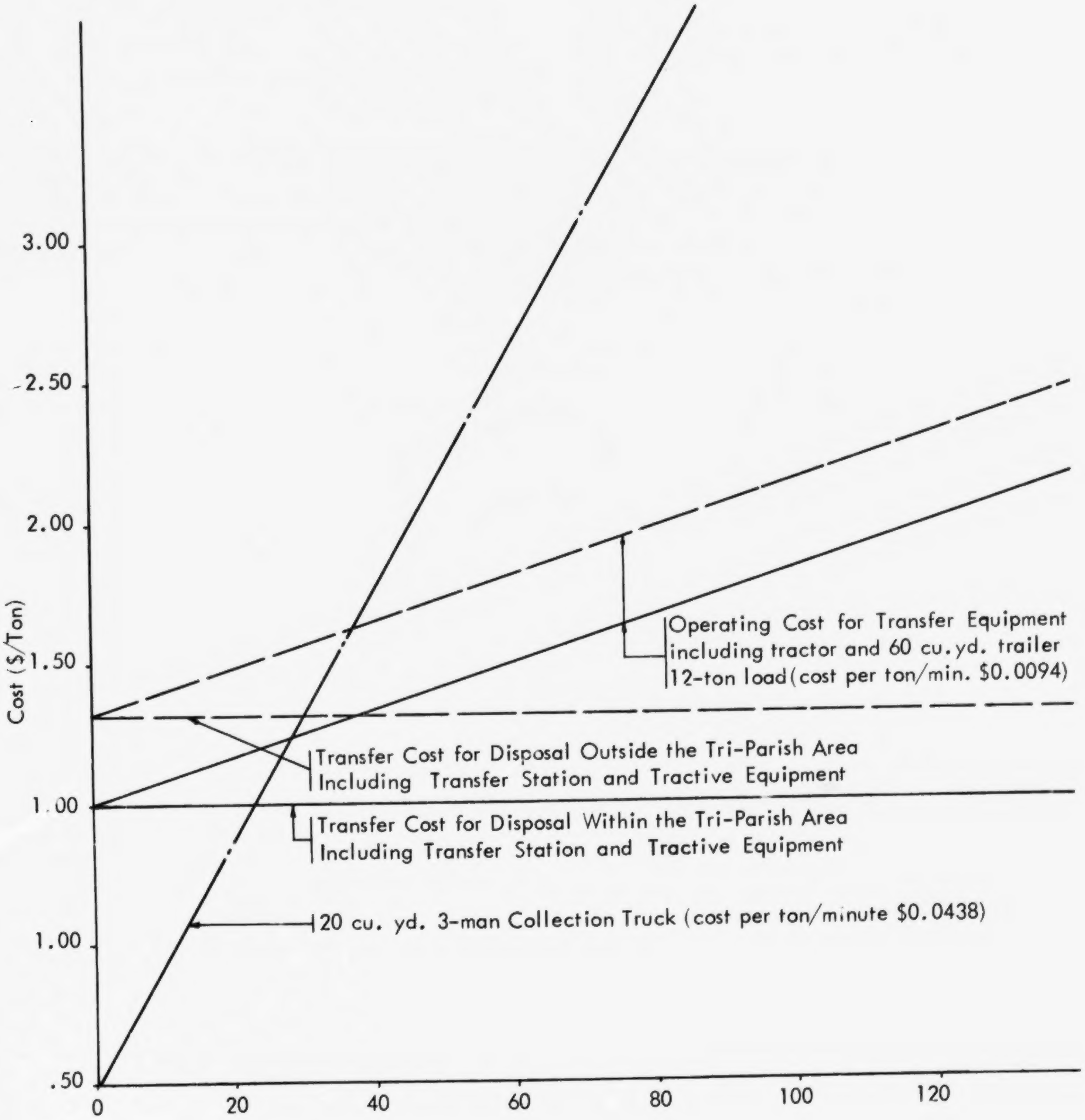
	Annual	Daily	Hourly
*Operating and Maintenance	$ 7,820	$25.20	$3.60
Labor and Fringe Benefits	6,814	21.84	3.12
TOTAL	$14,634	$47.04	$6.72

*Based on 312 operating days per year, seven hours production per day.

These 60-cubic yard transfer trailers have a maximum tonnage capacity of 15 tons based upon a 500 pound per cubic yard weight of compacted refuse. Assuming that nominal operation of these units would be at approximately 90% of capacity or 13.5 tons per load, the cost is calculated at $0.0083 per ton/minute.

The cost of transportation of the refuse in terms of cost per ton/minute has been calculated for the 20-cubic yard (5 ton) compactor collection trucks with three-man crews as presently operated by the City of New Orleans. Based upon annual average operating costs of these trucks (see Chapter V), the hourly operating cost including labor was calculated at $10.50. Assuming a nominal 80% working capacity of these trucks at four tons, results in a cost of $0.0438 per ton/minute.

The cost of operating a transfer station for disposal within the Tri-Parish area has been estimated at $1.00 per ton including tractive equipment while the cost for disposal outside the Tri-Parish area has been estimated at $1.32 per ton due to the additional tractive equipment required. The cost per ton per minute for operating the 20-cubic yard and the 60-cubic yard compactor trucks together with the cost of operating the stations has been shown graphically on Figure IV-1.



HAUL COST TO DISPOSAL AREA

FIG. IV-1

The haul distances from each of the incinerators to the Dock Board land will vary considerably depending upon whether access is from Florida Avenue or from Paris Road. These distances together with the distances to the Blind Lagoon site and the estimated times of travel are shown in Table IV-7. Also shown is the cost of hauling as determined by Figure IV-1.

TABLE IV-7
COST OF HAULING REFUSE FROM COLLECTION DISTRICTS TO PROPOSED SANITARY LANDFILL SITES

Incinerator Designation	Dock Board Property						Blind Lagoon		
	Florida Avenue Entr.			Paris Road Entr.					
	Dist. in Miles	Travel Time Min. @ 15 mph	Cost* Per Ton ($)	Dist. in Miles	Travel Time Min. @ 20 mph	Cost* Per Ton ($)	Dist. in Miles	Travel Time Min. @ 25 mph	Cost* Per Ton ($)
Florida Avenue	6.0	48	1.52	11.0	66	1.67	13.3	64	1.65
St. Louis Street	6.0	48	1.52	11.0	66	1.67	14.8	71	1.72
Seventh Street	9.0	72	1.73	13.0	78	1.78	17.7	85	1.83
New Orleans East	14.0	112	2.03	3.5	21	0.90	7.4	36	1.42
Algiers	11.0	88	1.87	16.0	96	1.92	19.8	95	1.92

*Includes 15 minutes at dumping area for unloading

In Table IV-8 we have shown the total cost of waste disposal at both Dock Board and Blind Lagoon sites. It will be observed that the cost of sanitary landfill for a site on the Dock Board property, depending upon location even from those areas closer to this property would average about $4.17 per ton while the cost of operating a sanitary landfill at Blind Lagoon would be somewhat higher.

TABLE IV-8
COST OF REFUSE DISPOSAL BY SANITARY LANDFILL WITHIN NEW ORLEANS AREA ($ per Ton)

	Dock Board Property			Blind Lagoon
	Fla. Ave. Entr.	Average	Paris Rd. Entr.	
Florida Avenue	4.10	4.17	4.25	4.63
St. Louis	4.10	4.17	4.25	4.30
Seventh Street	4.31	4.33	4.36	4.41
New Orleans East	4.61	4.04	3.48	4.00
Algiers	4.45	4.47	4.50	4.50

Based on the proposed program of incinerator improvement and enlargement discussed in detail in Chapter V, we estimate the cost of refuse disposal by incineration at $3.50 per ton including interest and amortization of the capital cost as well as operation and maintenance.

We conclude, therefore, that except for sanitary landfills located within the Tri-Parish area close to the collection districts this method of disposal is not as economical as central incineration.

a. Truck Transport of Refuse to Locations Outside the Tri-Parish Area

The relatively high cost of sanitary landfill at these previously discussed sites, compared with that generally experienced, is due to the extensive site preparation required and to the necessity for importing river sand as a cover material. If it were possible to locate a site where suitable cover material was available and the land was sufficiently high as not to require diking, these costs could be reduced by approximately half of those estimated herein, or say $1.30. We have also considered the cost of developing sanitary landfills outside of the area where cover material would be available and cofferdamming would be unnecessary. We have examined each of the highways leading from the Tri-Parish area and determined the probable distance that would be necessary to travel to reach a suitable site for a sanitary landfill. We have assumed that a sanitary landfill under these conditions could be operated for $1.50 per ton including the cost of land. In Table IV-9 we have shown the haul distance and cost as well as total cost for disposal at these relatively remote sites using transfer trucks to haul the refuse from transfer stations located in each collection district. It shows total disposal costs per ton, ranging from a low of $3.80 to $5.65, all above the estimated cost of incineration shown in Chapter V. We conclude, therefore, that truck transportation of refuse to remote sanitary landfills is not the best solution to the waste disposal problem particularly since the disposal areas would be in other political jurisdictions outside of the control of the Tri-Parish area.

TABLE IV-9
HAUL DISTANCE AND COST OF DISPOSAL TRUCK TRANSPORT TO LANDFILLS OUTSIDE PARISH AREA

Route	Average Speed (mph)	Dist. To Disposal Site (Miles)	Travel Time Outside City Round Trip (Min.)	Plus 40 Min. Travel Inside City (Min.)	Cost of Haul To Possible Disposal Sites ($/Ton)	Total Cost of Sanitary Landfill ($/Ton)
U. S. 90 East leading through New Orleans East via the Chef Menteur Highway	40	35	105	145	2.52	3.92
U. S. Highway 11 leading northeast to St. Tammany Parish	40	30	90	130	2.40	3.80
Interstate 10 East leading to New Orleans East and St. Tammany Parish	45	35	93	133	2.42	3.82
U. S. 90 West through St. Charles Parish	40	37	111	151	2.58	3.98
U. S. 61 leading northwest through St. Charles Parish	30	50	200	240	3.30	4.70
Pontchartrain Causeway (Toll Road) leading north across Lake Pontchartrain to St. Tammany Parish	40	35	105	145	2.53	3.93
State Road 18 leading to the east on the Westbank of the Mississippi River	20	25	150	190	2.90	4.30
State Road 44 leading west on the Eastbank of the Mississippi River	20	50	300	340	4.15	5.65
State Road 45 leading to the south into Jefferson Parish	30	None	-	-	-	-
State Road 23 leading southeasterly on the Westbank of the Mississippi River	30	None	-	-	-	-
State Road 39 leading southwest on the Eastbank of the Mississippi River	20	None	-	-	-	-
State Road 46 leading easterly in St. Bernard Parish	30	None	-	-	-	-

b. Rail Transport of Waste to Locations Outside the Tri-Parish Area

Since several areas in the United States are presently considering rail transportation of refuse from the collection areas to remote sanitary landfill areas, we have also considered this method of transportation for the Tri-Parish area.

Factors affecting the feasibility of rail transport of wastes include determination of routes, distances, classification of cargo and applicable rates, availability of equipment, time schedules, availability of rail spurs at locations of transfer stations and assembly of the loaded cars. Method and time for unloading, and equipment requirements for rehandling and transporting wastes from point of unloading to point of deposit at the sanitary landfill operation. Assuming that the point of transport would be beyond the Tri-Parish limits, private and public reaction of the recipients must then also be considered.

In order to establish guidelines for this investigation, discussion with experienced and knowledgeable railroad officials and other personnel was undertaken. In the initial discussions the following data pertaining to transport of wastes by rail were outlined:

> Assume base quantity of 600 tons per day to be handled at a single transfer point.
>
> Weight of waste material assumed to be 250 pounds per cubic yard (600 tons would be equal to some 4,800 cubic yards).
>
> Weight of ground waste material would average approximately 700 pounds per cubic yard (600 tons would occupy 1,800 cubic yards).
>
> Daily loading of wastes at the transfer station would require a nominal seven hours, between 7:00 AM and 2:00 PM at the transfer station.
>
> The City would own and operate the transfer station.
>
> A minimum ten-year contract period was assumed to allow for amortization of the plant as well as railroad equipment.
>
> The unloading method (type of car, hopper chutes, conveyors, etc.) though not determined, must be considered together with the time requirements for unloading in order to permit rapid return of the cars to the transfer station for re-use. Minimum unloading time has been estimated at four hours.
>
> Cars must be cleaned to prevent return of flies, etc. to the City as has happened in the Netherlands.
>
> Assume a nominal 50-mile transport distance as a basis for tonnage or carload rates.
>
> Determine transport time and arrival at the point of disposal for scheduling daylight operation of sanitary landfill.

With the guidelines as outlined above, the railroads were asked to determine the type and number of cars required to handle this material, the availability of equipment and to specify those routes that could be considered for the movement of this material as well as the availability and location of spurs within this maximum distance range.

In consideration of these factors, railroad representatives emphasized the following:

> A specified number of cars would necessarily be reserved 24 hours a day, 6 days a week for this service.
>
> Productivity of these cars would be limited to a short payload distance "dead heading" on the return.
>
> Expensive car-types (bottom or side discharge) would be best suited for this service.
>
> Certain uncontrollable variations in arrival and departure of other rail traffic would, on occasion, also cause extreme variations in departure and/or arrival time of refuse cars. This circumstance would in all likelihood occur frequently.

Due to the above factors exploration of the economics of rail transport was not considered warranted. However, for comparison purposes similar investigations in the State of Florida revealed that costs of transport could be expected to be about $5.20. This cost was based on a Class 20 rating at a rate of $0.26/100 lbs., transporting 50 miles, with minimum 20 ton weight per car. Transport costs together with transfer (loading) costs at $1.00/ton, unloading & transfer to working site of landfill at $1.00/ton and sanitary landfill operation at $1.50/ton would present total disposal costs of $8.70/ton.

It should be pointed out that the above is based on a density of 400 lbs. per cubic yard, which density is usually obtained with a conventional packer. However, research under way at the present time indicates that the cost of rail haul for refuse may be reduced to as little as $2.00 per ton, provided that suitable compaction equipment can be developed to give a density of 80 lbs. per cubic foot to the refuse being transported, which would permit loads of 100 tons per car. This will require the development of baling equipment capable of about twice the compaction possible with presently available commercial equipment. We estimate that under such conditions, the total cost of refuse disposal utilizing rail haul might be expected to be in the vicinity of $6.00 per ton.

V NEW ORLEANS

A. Description of the Sanitation Department

1. Organization and Personnel

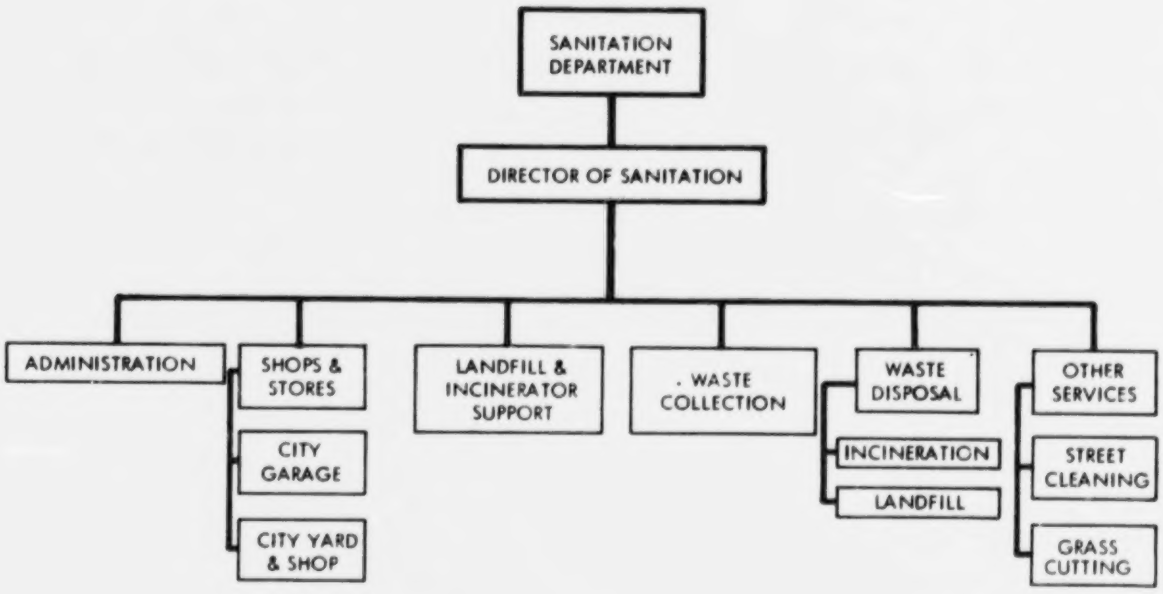
Organizational structure of the Sanitation Department is complex in terms of departmental responsibilities. Functions of the Department consist of municipal collection and disposal of solid wastes in the City of New Orleans, allied duties in connection with these operations and miscellaneous services not directly connected with the solid waste system. Including administrative and supervisory personnel, the Department consists of a labor force of nearly 1,000 employees, a fleet of some 300 vehicles, an operational budget in excess of $5 million, and a multi-million dollar investment in existing waste disposal facilities, all under the management of the Director of Sanitation with responsibility to the Mayor, City Council, and taxpayers.

In order to operate efficiently, all supervisory and administrative personnel must, to varying degrees, understand the functional operations necessary to manage control and administer the responsibilities with which they are charged. Organizational structure of this Department is illustrated in Figure V-1 showing the principal divisions within the Department. In 1968, for performance of the respective duties of these various departmental divisions, authorized personnel numbering 946 was approved with the following distribution by division:

Administration	17
Shops and Stores	124
Incinerator Support	15
Waste Collection	415
Waste Disposal	224
Other Services	151
Total Personnel	946

It is the aim of the Director's office to establish a relationship among the various operational divisions involved and their respective first-line supervisors so that joint coordinated action of each division is possible in the accomplishment of their common tasks. Departmental communication is established with the supervisory personnel by

FIGURE V-1
ORGANIZATIONAL STRUCTURE
SANITATION DEPARTMENT - CITY OF NEW ORLEANS


SANITATION DEPARTMENT
DIRECTOR OF SANITATION
ADMINISTRATION
SHOPS & STORES
CITY GARAGE
CITY YARD & SHOP
LANDFILL & INCINERATOR SUPPORT
WASTE COLLECTION
WASTE DISPOSAL
INCINERATION
LANDFILL
OTHER SERVICES
STREET CLEANING
GRASS CUTTING

means of weekly staff meetings held by the Director of the Sanitation Department to update on changing policies and procedures, criticism of the operation, and exchange of ideas for a better coordinated operation.

A safety education program was expanded in 1967 for the minimizing of accidents and personnel injuries. The program now in effect is divided into the two phases of vehicular accidents and occupational injury.

The vehicular phase of the program commences when a driver applies for an Equipment Operator I job. All drivers are thoroughly screened by Civil Service, which includes medical examination, investigation through traffic courts, a written examination, and an on-the-road driving test by a Department representative to determine the required skill and ability of the applicant in operating large equipment. Once these pre-requisites have been met, the applicant is ready to be classified as an Equipment Operator I. In conjunction with the Vehicular Accident Control Safety Program within the Department, a Safety Committee has been formed. All accidents (minor or major) are reported and require a written accident report by the supervisor and forwarded to the central office. In cases of major accidents, a serious bodily injury, fatality or vehicular damage, the Department Head and insuror are notified immediately. From these reports a summary is prepared and distributed to the Safety Committee members who meet monthly with the supervisors and offending employees. The Safety Committee is composed of representatives of the Civil Service insuror, claims adjuster, and department supervisors. An account of each accident is read in the presence of the person involved. Following this report, the offender explains the accident with visual aids. After the visual demonstration and the question and answer session are completed, the Committee discusses causes, circumstances, safety factors, and results of accident. Having reached a decision, the accident is judged "avoidable" or "unavoidable", and written in the employee's record as such. The penalty imposed depends upon individual's previous driving record after a majority decision is reached by Committe. The penalty ranges from a reprimand, remedial driver instruction, suspension, demotion, or dismissal. Pertinent safety pamphlets are distributed by the insuror. A Civil Service representative prepares a summary of the monthly meeting, which is distributed to the men in the field via the supervisors.

The occupational injury phase of the program was added in 1967. With a 12% rise in occupational injuries in 1967 a program was initiated by Civil Service and Sanitation Department in an effort to control injuries and high medical cost to the City. With the cooperation of Civil Service, Sanitation, and Red Cross, a program has been devised to train personnel in First Aid care. In addition, Civil Service has organized a monthly meeting to study and develop methods of controlling and preventing occupational injuries by means of education and communication with personnel via their supervisors. Monthly injury reports are reported to Civil Service for analysis. In addition, safety posters and pamphlets dealing with Occupational Injuries are distributed. Occupational injuries are normally lessened by issuance of safety equipment relative to job classifications. The range of equipment issued by the Department to personnel (dependent on type of assignment) includes orange decaled raincoats, orange helmets, protective gloves, orange shirts, steel-toe shoes, goggles, and respirators. The City of New Orleans provides this safety equipment free-of-charge after a six months probationary period. When a man resigns or is dismissed, he must return all safety equipment. Policy requires all men to use their safety equipment as a condition of continued employment.

Salary levels as established by City Civil Service are based on skills and position classification. Each classification carries a pay range number identifying the minimum monthly rate and five in-grade pay steps. These in-grade pay increases are equivalent to about 5% of the preceding rate and are awarded on a merit basis.

In addition to the six steps from minimum to maximum pay within a given classification, four additional steps are authorized as longevity increases. Table V-1 provides full details on the dollar increments of these step increases by the applicable pay range numbers.

TABLE V-1

MONTHLY PAY RATES

Range Number	Six Steps Within Each Classification						Longevity Increases			
	Min.					Max.	1st	2nd	3rd	4th
14	281	295	310	325	341	358	18	19	20	21
15	295	310	325	341	358	376	19	20	21	22
16	310	325	341	358	376	395	20	21	22	23
17	325	341	358	376	395	415	21	22	23	24
18	341	358	376	395	415	436	22	23	24	25
19	358	376	395	415	436	458	23	24	25	26
20	376	395	415	436	458	481	24	25	26	28
21	395	415	436	458	481	505	25	26	28	29
22	415	436	458	481	505	530	26	28	29	31
23	436	458	481	505	530	556	28	29	31	32
24	458	481	505	530	556	584	29	31	32	34
25	481	505	530	556	584	613	31	32	34	35
26	505	530	556	584	613	644	32	34	35	37
27	530	556	584	613	644	676	34	35	37	39
28	556	584	613	644	676	710	35	37	39	41

The Sanitation Department's employment experience in 1967 is detailed in Table V-2. A high percentage (nearly 86%) of personnel turnover was experienced during 1967, due primarily to the tremendous rate (about 140%) experienced in the Collection Division. The Disposal Division ranked second in the Department with a turnover of 80 employees or about 50% of the average 161 required. This turnover occurred principally in the labor classifications.

Although the percentage of turnover was high this rate was due primarily to repeated turnover of a minor number of positions in the Collection and Disposal Divisions. The availability of labor from normal waiting lists maintained by the Department was adequate to fill these vacancies rapidly. The high rate of labor turnover is not

TABLE V-2
SANITATION DEPARTMENT EMPLOYMENT EXPERIENCE IN 1967

Division	Employees		Sick Leave		Annual Leave		Employee Turnover	
	Avg. No.	Man Days	Days Used	%	Days Used	%	No.	%
Director's Office	15	3,936	164 1/2	4.18	276 1/2	7.02	---	0
Shops and Stores	120	35,538	2,139 1/2	6.02	1,486 1/2	4.18	43	35.83
Garbage and Trash Collections	392	116,400	435 1/2	3.74	3,132 1/2	2.69	548	139.80
Garbage and Trash Disposal	161	49,385	4,080	8.26	2,955 1/2	5.98	80	49.69
Other Services:								
Street Cleaning*	125	39,680	1,936	4.88	1,682 1/2	4.24	36	28.80
Grass Cutting	12	3,844	213	5.54	161	4.19	1	8.33
TOTALS	825	248,783	12,885 1/2	5.18	9,694 1/2	3.90	708	85.82

* Includes Incinerator Support

unusual and is due largely to several interrelated factors (1) disagreeable nature of the work, (2) physical output, (3) extremes in climate, and (4) a six-day work week.

Certain apparent inequities exist in labor classification. The present pay scale for incinerator plant laborers, ranging from $281 to $358 per month and requiring six-hour, forty-minute shifts, six days per week is equivalent to an hourly wage scale of $1.625 to $2.075. Incinerator plant laborers are predominantly at the lower rate which is below prevailing rates for semi-skilled labor in the area. Conversely, the same pay range applicable to the collectors, working on the task basis, and averaging say, 5 1/2 hours per day, permits them the opportunity, based on crew productivity, to draw about $1.975 per hour as a starting rate.

Classification of collection, disposal, and support personnel authorized by the 1968 Budget and employed as of February 15, 1968, is listed in Tables V-3 through V-7, and also shows monthly pay range of each position. When occasional shortages of qualified personnel occur in the various divisions and manpower is not available to permit the Department to build up to the authorized level, it is common practice to double-shift existing personnel. Due to pay scales and short work-day shift presently in force, it is not uncommon for employees to hold a second job either within the Department or in private enterprise.

TABLE V-3
1968 ALLOCATED PERSONNEL - INCINERATION

Classification	Monthly Pay Range			Personnel Assignment by Incinerator Plants											
	Minimum	Maximum	*No.	Fla. Ave.		Algiers		Seventh St.		St. Louis		N. O. East		Total	
				A	E	A	E	A	E	A	E	A	E	A	E
General Superintendent Incinerator Foreman III	$530.00	$676.00	27	-	-	-	-	1	1	-	-	-	-	1	1
Plant Superintendent Incinerator Foreman II	481.00	613.00	25	1	1	1	1	1	0	1	1	1	1	5	4
Shift Foreman Incinerator Foreman I	395.00	505.00	21	4	2	4	4	4	4	4	0	4	2	20	11
Crane Operator Equipment Operator III	415.00	530.00	22	4	3	4	2	4	3	4	2	4	2	20	13
Maintenance Repairmen	376.00	481.00	20	2	1	2	0	2	1	2	1	2	1	10	4
Ash Driver Equipment Operator I	325.00	415.00	17	6	5	4	3	6	3	6	0	4	2	26	13
Laborers **	281.00	358.00	14	25	21	20	20	24	24	24	8	24	17	117	90
TOTAL				42	33	35	30	42	36	41	12	39	25	199	136

*See Table V-1 for steps by Pay Range No.
**Scaleman and clerks are included in laborer classification

A - Number of Personnel Allocated by 1968 Budget
E - Number of Personnel actually Employed 2/15/68

TABLE V-4
1968 ALLOCATED PERSONNEL - LANDFILLS

Classification	Monthly Pay Range			Personnel Allocated by Location			Total
	Minimum	Maximum	No.*	Gentilly Landfill	Algiers Landfill	Total	Personnel Employed 2/15/68
General Superintendent Labor Foreman II	$458.00	$584.00	24	2	1	3	3
Bulldozer Operators Equipment Operator IV	458.00	584.00	24	4	-	4	2
Crane Operators Equipment Operator III	415.00	530.00	22	6	2	8	8
Laborers	281.00	358.00	14	8	2	10	9
TOTAL				20	5	25	22

* See Table V-1 for steps by Pay Range No.

TABLE V-5
1968 ALLOCATED PERSONNEL - GARBAGE AND TRASH COLLECTION

Classification	Monthly Pay Range			Personnel Allocated by Districts						Total	Total Personnel Employed 2/15/68
	Minimum	Maximum	No.*	C	W	E-1	E-2	A	N		
General Superintendent Labor Foreman III	$530.00	$676.00	27	-	1	-	-	-	-	1	1
District Superintendent Labor Foreman II	458.00	584.00	24	1	1	1	1	-	1	5	5
Section Foreman Labor Foreman I	358.00	458.00	19	4	4	4	4	2	1	19	18
Drivers Equipment Operator I	325.00	415.00	17	25	26	31	25	11	13	131	111
Waste Collectors Laborers	281.00	358.00	14	49	52	64	49	21	24	259	259
TOTAL				79	84	100	79	34	39	415	394

*See Table V-1 for steps by Pay Range No.
**Collection Districts: C (Central), W (Western), E-1 (Eastern-I), E-2 (Eastern-II), A (Algiers), N (Night)

Incentives to attract qualified labor are provided in the generous fringe benefits, which include holiday pay, annual leave, sick leave, civil leave, educational leave, a retirement program, group insurance, and optional participation in the municipal credit union, as well as certain required equipment furnished free of charge to special classifications of employees.

The Mayor and City Council determine which holidays with pay will be granted to City employees. Normally ten official holidays, as listed below, are recognized and observed, however these holidays are dependent solely upon the governing body of the City that granted them.

New Year's Day
Mardi Gras
Good Friday
Independence Day
Labor Day
All Saints' Day
Veterans' Day
Thanksgiving Day
Huey P. Long's Birthday
Christmas Day

Other days, by special proclamation

TABLE V-6
1968 ALLOCATED PERSONNEL - INCINERATOR SUPPORT

Classification	Monthly Pay Range		No. *	Total Personnel	
	Minimum	Maximum		Allocated 1968 Budget	Employed 2/15/68
General Superintendent					
Labor Foreman II	$458.00	$584.00	24	1	1
Transfer Service					
Tractor-trailer Driver					
Equipment Operator III	415.00	530.00	22	3	2
Equipment Operator II	358.00	458.00	19	2	2
Container Service					
Dumpster Driver					
Equipment Operator II	358.00	458.00	19	4	2
Transfer Service					
Dump Driver					
Equipment Operator I	325.00	341.00	17	2	2
Laborers	281.00	358.00	14	3	2
TOTAL				15	11

*See Table V-1 for steps by Pay Range No.

A full-time employee of the Sanitation Department, accumulates annual leave with pay at a rate of one and one-half days each month throughout the year but can accrue to a maximum of only ninety days. Annual leave with pay cannot be taken until completion of six months of service. Request for annual leave is made to the supervisor who in turn submits the request through the Central Office for approval. The Department grants an additional day of annual leave for each calendar year of completed service up to a maximum of three additional days. In the event an employee should resign from the Department, the City will pay the accrued annual leave time at the current rate of pay provided the employee gives the superintendent a ten-day notice of his resignation.

TABLE V-7
1968 ALLOCATED PERSONNEL
SHOPS AND STORES (CITY GARAGE AND YARD)

Classification	Monthly Pay Range		No.*	Personnel Allocated by Location			Total Personnel Employed 2/15/68
	Minimum	Maximum		City Yard	City Garage	Total	
Superintendents	$446.00	$710.00	28	1	1	2	2
Workshop Foreman	530.00	676.00	27	1	-	1	1
Auto Mechanic Foreman	505.00	644.00	26	-	5	5	5
Electrician	505.00	644.00	26	1	-	1	1
Plumber	505.00	644.00	26	1	-	1	1
Machinist	505.00	644.00	26	1	2	3	3
Carpenter	458.00	584.00	24	3	-	3	3
Welder	458.00	584.00	24	3	2	5	5
Auto Mechanics	458.00	584.00	24	-	28	28	25
Sheet Metal Worker	458.00	584.00	24	2	-	2	2
Spray Painter	415.00	530.00	22	1	3	4	3
Equipment Operator I	325.00	415.00	17	3	2	5	4
Storekeeper II	325.00	415.00	17	-	1	1	1
Typist Clerk II	325.00	415.00	17	-	2	2	2
Storekeeper I	281.00	358.00	14	2	3	5	3
Broommaker	281.00	358.00	14	1	-	1	1
Maintenance Worker	281.00	358.00	14	-	1	1	1
Laborers	281.00	358.00	14	22	28	50	44
Watchmen	281.00	358.00	14	4	-	4	4
TOTAL				46	78	124	111

*See Table V-1 for steps by Pay Range No.

Sick leave with pay is earned at the rate of two days per month. If during any month the employee has taken any leave without pay, he does not accrue sick leave for that month. Unlike annual leave, there is no limit to accruement and it may be used within the first six months. Sick leave is granted to employees absent from duty only because of illness, injury, or death in the immediate family. If the employee is on leave for more than six consecutive working days a doctor's certificate must be furnished upon returning to work.

Civil leave with pay is granted to perform such civic duties as voting, serving as an election official, answering a subpoena, and for taking Civil Service, Armed Forces, or Selective Service examinations.

Military leave is granted employees who have entered active military service in the armed forces and they are allowed leave-of-absence with pay up to 15 working days. Military leave without pay is also granted with assurance of reinstatement in the position vacated within 90 days of his honorable discharge.

Educational leave is granted to permanent employees by the approval of the City Civil Service Commission. A special leave with pay up to one year may be obtained for educational training directly related to an employee's work in his department.

A Retirement Program administered by a Board of Trustees consisting of five members, was established by the City in 1947. Membership in the retirement system is compulsory for all City employees. Each employee contributes five per cent (5%) of his salary each pay day and the City of New Orleans contributes a larger percentage to maintain the system on an actuarily sound basis. For example, for the fiscal year ending June 30, 1967 the City contributed 60.5% while the members of the program contributed 39.5%. The employee and the City also contribute to the Social Security Program which further supplements the Municipal Retirement Program.

Eligibility for retirement benefits of the Municipal Program is based upon at least ten continuous years of creditable service with the City by age sixty, with retirement compulsory at age sixty-eight. Upon retirement, the employee chooses one of several optional plans for settlement which best meets his requirements. The employee's monthly benefit is based upon type of plan, number of service years, and average earnings. The amount of the monthly pension is basically equivalent to two percent (2%) of the average monthly salary earned during the employment period times the number of years employed. If an employee is separated from City employment, he may either withdraw his retirement contributions with interest or permit the accumulated contributions to continue drawing interest for five years.

The group medical and hospitalization insurance is provided by the City through a Blue Cross Plan. A basic plan, for employees only, including major medical coverage, is paid for in full by the City. If an employee includes dependents or optional riders, he is required to pay for the additional coverage through automatic payroll deductions. Medical, surgical, and hospital care under the provision of the Workmen's Compensation Law of Louisiana are assured to an employee injured on the job.

If it is determined that an employee is to be absent due to work-connected injury, generally, he has a choice of using his sick leave, annual leave, or file a claim for Workmen's Compensation. At present, maximum benefits are based on the Workmen's Compensation rate of $35.00 per week over a maximum period of 400 weeks.

Credit Union membership is available in New Orleans Municipal Employee's (NOME) Credit Union, a non-profit organization. Savings on deposit draw 5 1/4% interest annually and loans are available to members at an interest rate of 1% a month on the unpaid balance. Loan repayments or savings deposits can be made through automatic payroll deductions. The Credit Union is governed by Federal and State laws which protect the rights and investments of all members.

2. Budget and Operating Costs

Operating costs of the Department are financed through the City's General Fund. Current Operating Budget for 1968 as approved stands at $5,161,703. Allocations within this Department budget are as follows:

Administration	$ 115,420
Shops and Stores	1,543,717
Incinerator Support	77,800
Waste Collection	1,787,253
Waste Disposal	1,027,774
Other Services	609,739
Total Budget	$5,161,703

Pro rata reduction of those funds (such as administration, shops and stores, etc.) not entirely applicable to the solid waste budget and elimination of the total funds budgeted for "Other Services" presents the net funds approved for solid waste collection and disposal in the amount of $4,222,445 allocated to the various divisions as follows:

Administration	$ 94,644
Shops and Stores	1,234,974
Incinerator Support	77,800
Waste Collection	1,787,253
Waste Disposal	1,027,774
Total Solid Waste Budget	$4,222,445

This budgeted sum generally includes allocations for all out-of-pocket operating expenses for the year, but certain known costs such as the cost of fringe benefits (including group insurance, social security, and pension fund) totalling 11.4% of gross payroll, utilities at the various plant locations, equipment insurance and capital expenses are not included in the budgeted fund. Such variable cost items as plant and equipment maintenance are reflected in the budget as allowance items. Previous years' maintenance records indicate that costs will be substantially higher. As additional funds for maintenance or emergency needs are required they may be obtained through justified supplementary budget requests.

Analyses of actual costs incurred in 1967 and projected costs anticipated in 1968, (including adjustments to the budget allocations for 1968), were made of the principal divisional activities of the Department as shown in Table V-8. By comparison to the foregoing allocation of budgeted funds, those sums classified as Shops and Stores (maintenance and repairs) have been distributed to the divisions receiving these services.

The anticipated increase in costs from 1967 to 1968 (about $625,000 or 14.0%) is due principally to the assumed full operation of both St. Louis and New Orleans East incinerators, together with expected increases in labor rates in all division. These projected costs as anticipated for 1968 (including those adjustments for payroll taxes, insurance, utilities, probable maintenance requirements and capital expense) exceed the budget as approved by some 20.4%.

TABLE V-8
OPERATING COSTS - SANITATION DEPARTMENT

Division	1967		1968	
	Actual Costs	% Total	Projected Costs	% Total
Administration	$ 104,638	2.3	$ 104,638	2.1
Collection	2,581,537	57.5	2,693,354	52.7
Disposal:				
Incineration	1,343,371	30.0	1,869,028	36.6
Landfill	269,505	6.0	267,157	5.2
Incinerator Support	181,016	4.2	171,648	3.4
Total Solid Waste Costs	$4,480,067	100.0	$5,105,825	100.0

Based upon the population estimate of 687,190 and costs of $4,480,067 experienced in 1967, the per capita cost for operation of the solid waste system in New Orleans can be estimated at $6.42 for that year.

Cost analyses presented in detail later in this Report include all the above noted departmental costs of the solid waste system and exclude only the applicable portion of overhead costs of City government.

3. Municipal Waste Collection

The Sanitation Department of the City of New Orleans is charged with the collection and disposal of solid waste generated in the developed corporate area. This service is provided for the small producers of waste, such as households, small commercial and business installations, and this service is not provided to areas of low population density such as the southeast section of Algiers and the extreme northeastern area of the City.

a. Districts and Routes

The area being served by the Sanitation Department is divided for administrative and supervisory purposes into six collection districts. Referring to the District Map, Figure I-1 (backcover), the Central, Western, Eastern I, Eastern II, Night, and Algiers District are geographically delineated. Each of these districts is subdivided into the Monday-Wednesday-Friday and Tuesday-Thursday-Saturday collection areas with garbage and trash (combined), being collected three times each week in these areas.

In the Central District, each of the day group collection areas are subdivided into 22 collection routes, in the Western District 28 routes, in the Eastern I District 22, in the Eastern II District 23, in the Algiers District 8, and in the Night District 8 routes. In the case of the Night Districts, Routes 1, 2, and 3 are collected on a nightly basis, with the balance of the district subdivided into the Monday-Wednesday-Friday and Tuesday-Thursday- Saturday collection areas. In total, 111 collection routes are picked up daily in the City of

New Orleans, as illustrated in the route maps of each district, Figures V-2 through V-6.

b. Supervision

The line of supervision in the collection division consists of a general superintendent in charge of all collection activities, six district superintendents and the number of section foremen as the various districts require. The Central, Western, Eastern I, and Eastern II Districts are subdivided for supervision and policing into four sections each. These sections, each under the supervision of a section foreman, consist of from five to eight routes, variable by districts. Due to the limited number of routes in both the Night and Algiers Districts no further subdivision is made.

c. Collection Method

The collection method employed by the Sanitation Department consists of pick up at curb and alley locations. Advantages exist in this method in the rapidity of making collections along with resulting lower labor costs. Also, it is unnecessary for the collectors to enter onto private property. This collection method is the most economical from the standpoint of direct cost, although the amount of service provided is less compared with such systems as the setout and setback methods. There are certain disadvantages to this method such as the unsightly appearance of the streets on collection days when the full and empty containers remain on the streets or alleys for long periods of time. Also, it is not unusual for the refuse to be strewn over the streets, alleys, or yards. Although the curb and alley collection system is the cheapest from the standpoint of direct cost, generally street cleaning expense increases.

d. Equipment and Maintenance

Collection equipment for each of the districts is assigned to the district garages, which are located as accessory facilities at the existing incinerator plants. In the case of the Algiers District, equipment is based at the Algiers Incinerator Garage and the Western District equipment is

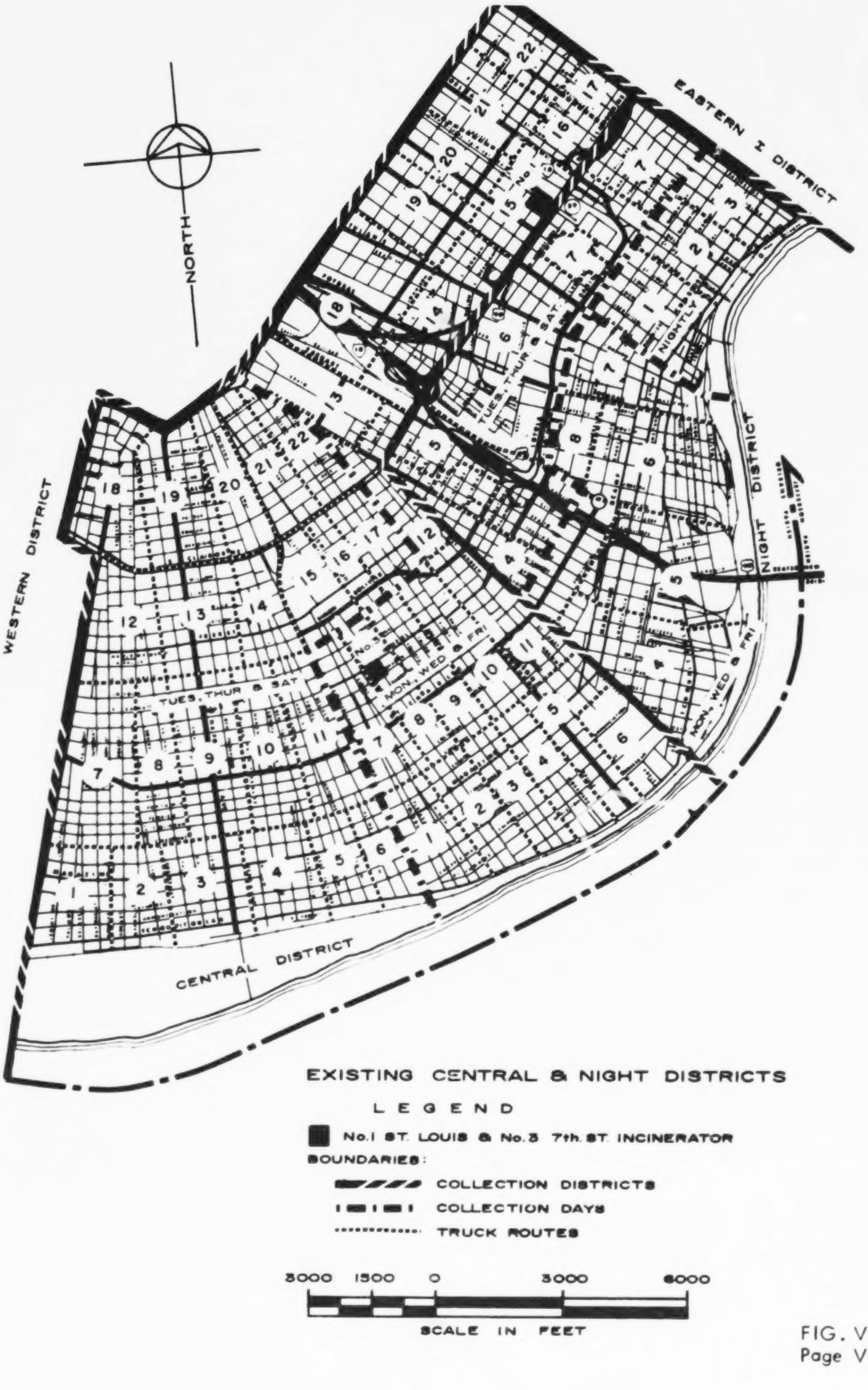
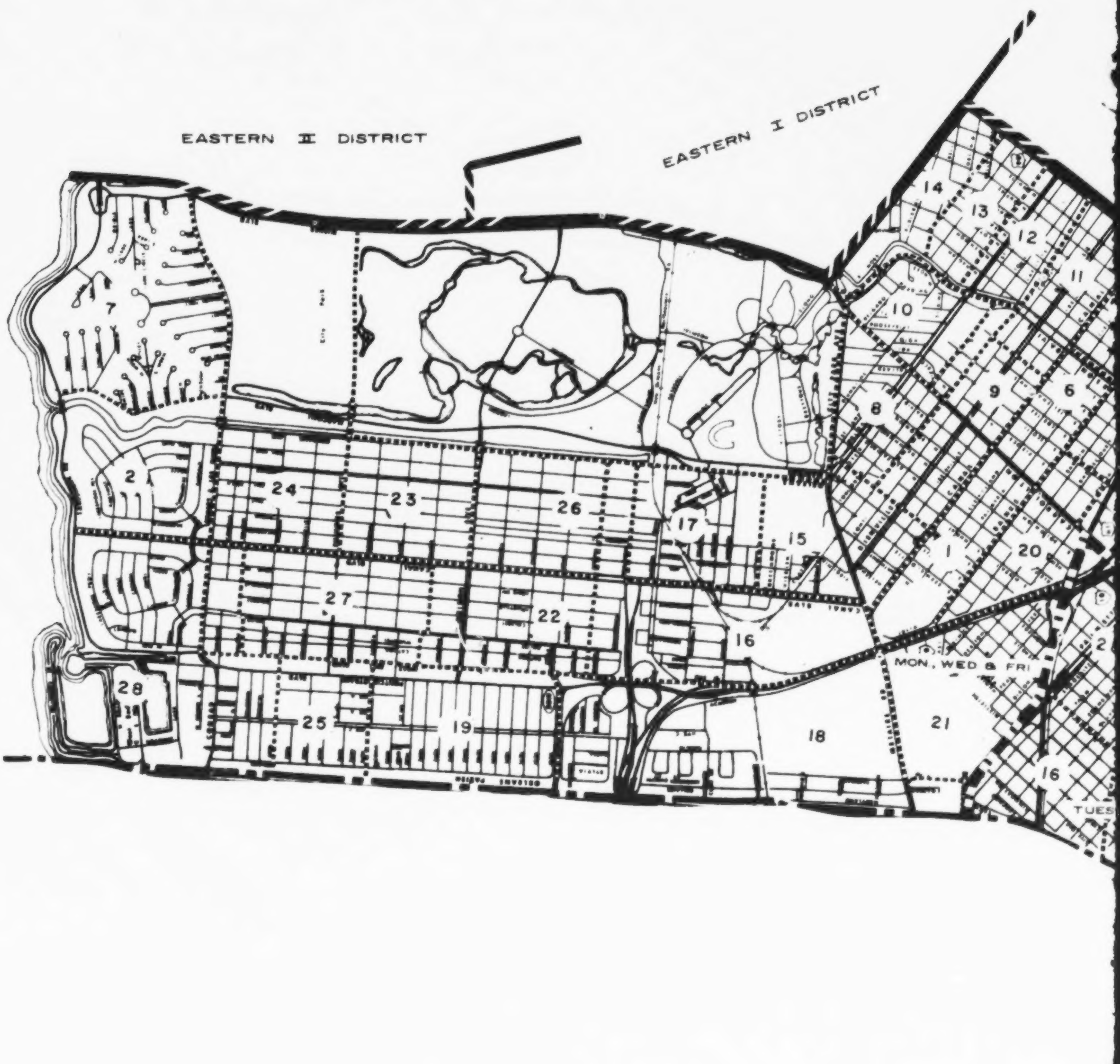
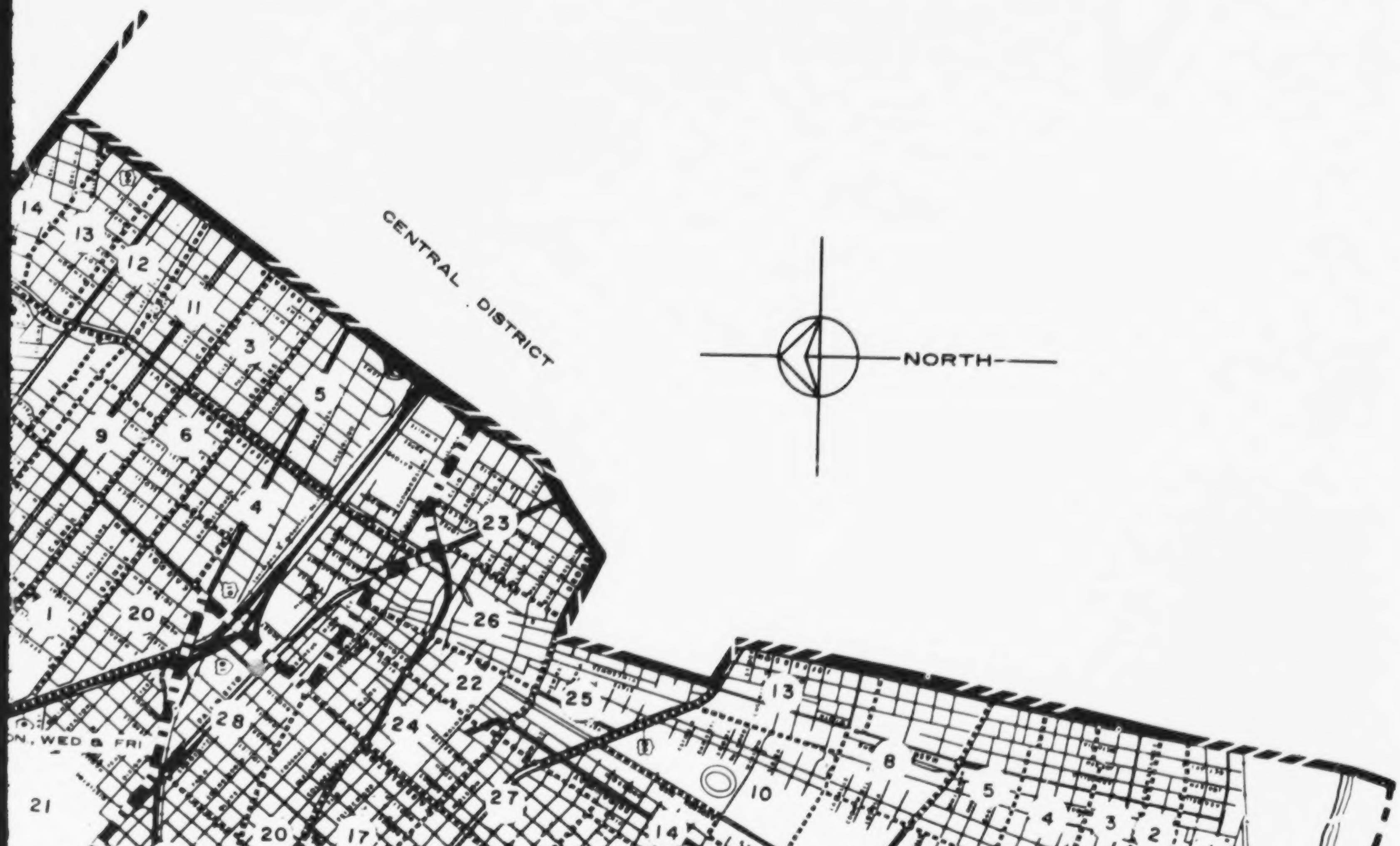

NORTH
EASTERN I DISTRICT
WESTERN DISTRICT
CENTRAL DISTRICT
NIGHT DISTRICT
NIGHTLY
TUES, THUR & SAT
TUES, THUR & SAT
MON, WED & FRI
MON, WED & FRI
No. 1
No. 3
EXISTING CENTRAL & NIGHT DISTRICTS
LEGEND
No. 1 ST. LOUIS & No. 3 7th. ST. INCINERATOR
BOUNDARIES:
COLLECTION DISTRICTS
COLLECTION DAYS
TRUCK ROUTES
3000
1500
0
3000
6000
SCALE IN FEET

FIG. V-2


EASTERN II DISTRICT
EASTERN I DISTRICT
1
2
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
MON, WED & FRI
TUES
3000 1500 0 3000 6000
SCALE IN FEET

A



CENTRAL DISTRICT
NORTH
ON, WED & FRI
TUES, THUR & SAT
ORLEANS PARISH
14
13
12
11
3
5
9
6
4
23
1
20
26
22
25
13
28
24
8
21
27
10
5
4
3
2
1
20
17
14
16
15
12
11
18
19
9
6
7
21

B

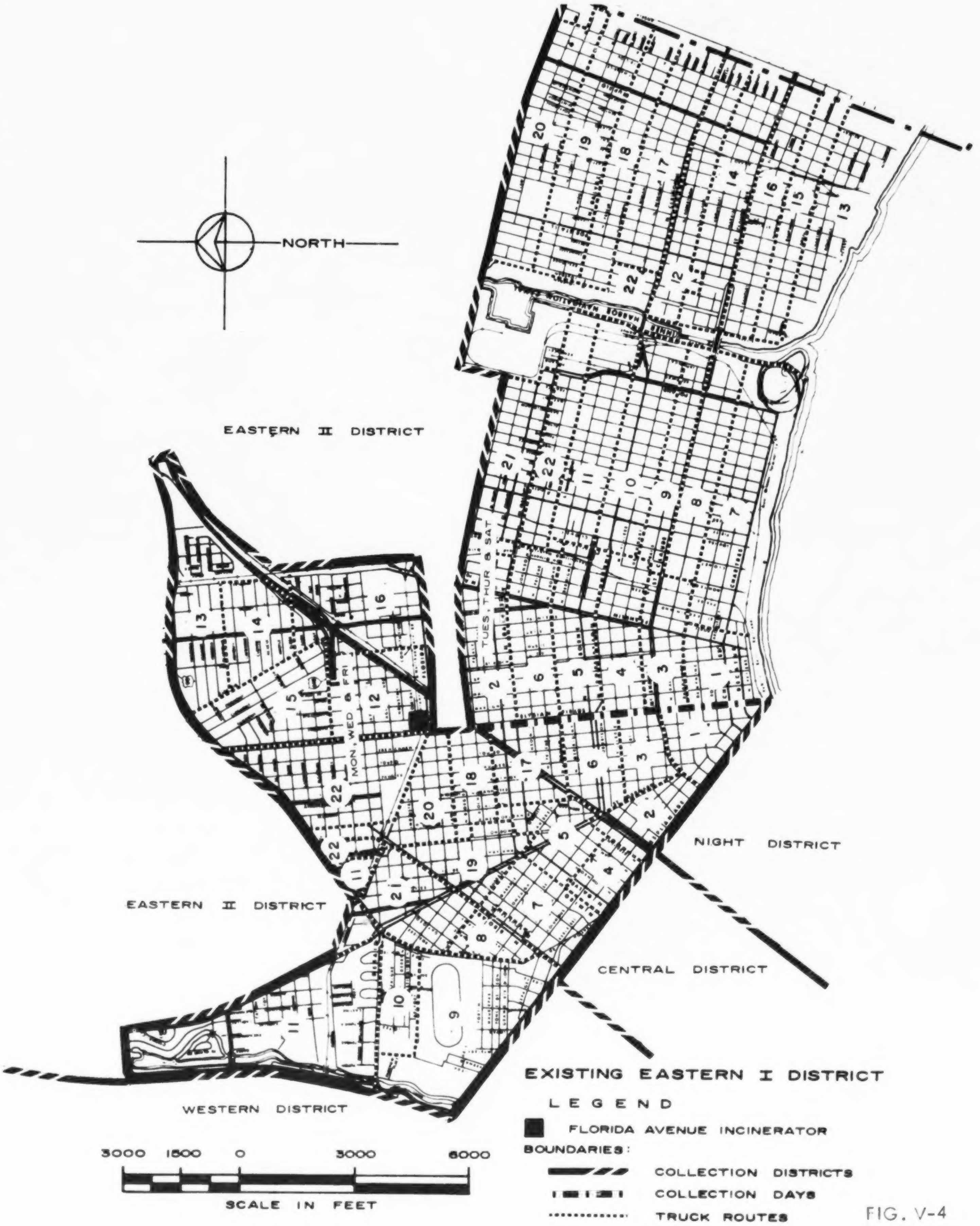
EXISTING WESTERN DISTRICT

LEGEND

BOUNDARIES:

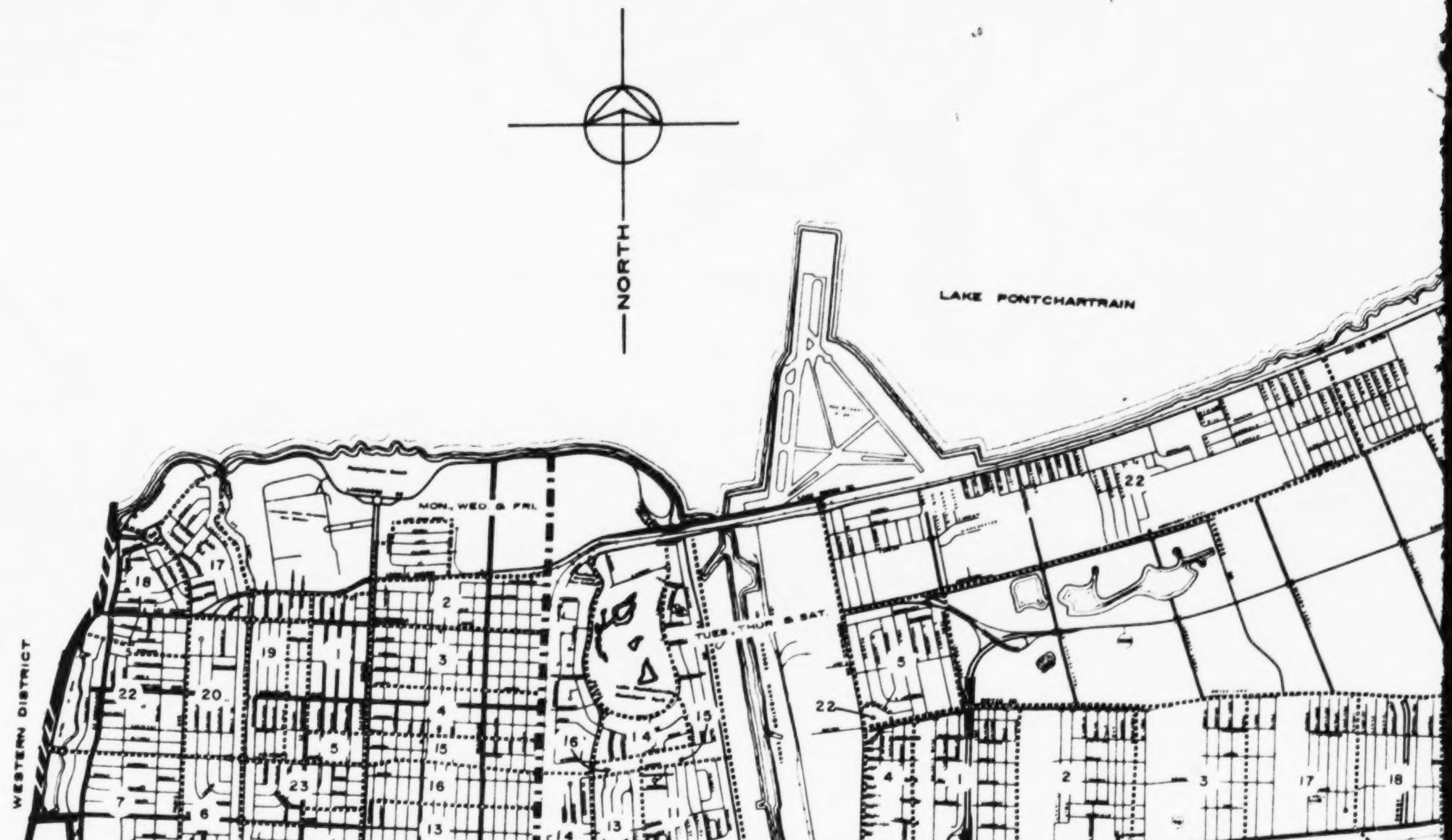
▰▰▰ COLLECTION DISTRICTS
▬ ▪ ▬ COLLECTION DAYS
········· TRUCK ROUTES

FIG. V-3

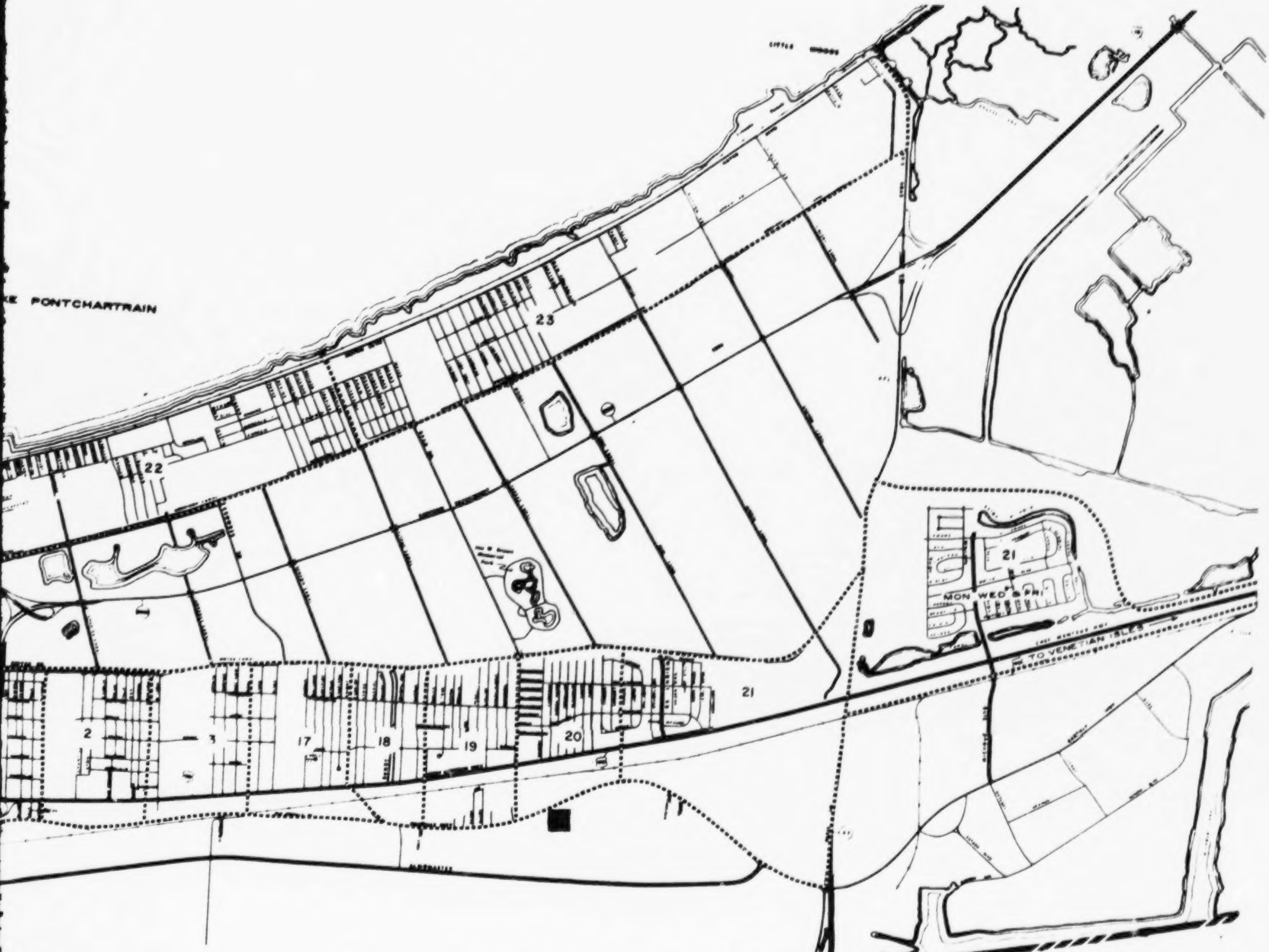

NORTH
EASTERN II DISTRICT
EASTERN II DISTRICT
NIGHT DISTRICT
CENTRAL DISTRICT
WESTERN DISTRICT
TUES, THUR & SAT
MON, WED & FRI
20
19
18
17
14
16
15
13
12
22
21
22
11
10
9
8
7
2
6
5
4
3
1
13
14
16
15
12
22
18
17
6
3
20
5
2
22
19
4
11
21
7
8
10
9
11
3000
1500
0
3000
6000
SCALE IN FEET
LEGEND
FLORIDA AVENUE INCINERATOR
BOUNDARIES:
COLLECTION DISTRICTS
COLLECTION DAYS
TRUCK ROUTES

EXISTING EASTERN I DISTRICT

FIG. V-4


NORTH
LAKE PONTCHARTRAIN
MON., WED & FRI.
TUES., THUR. & SAT.
WESTERN DISTRICT
EASTERN I DISTRICT
INTRACOASTAL WATERWAY
3000 1500 0 3000 6000
SCALE IN FEET

A

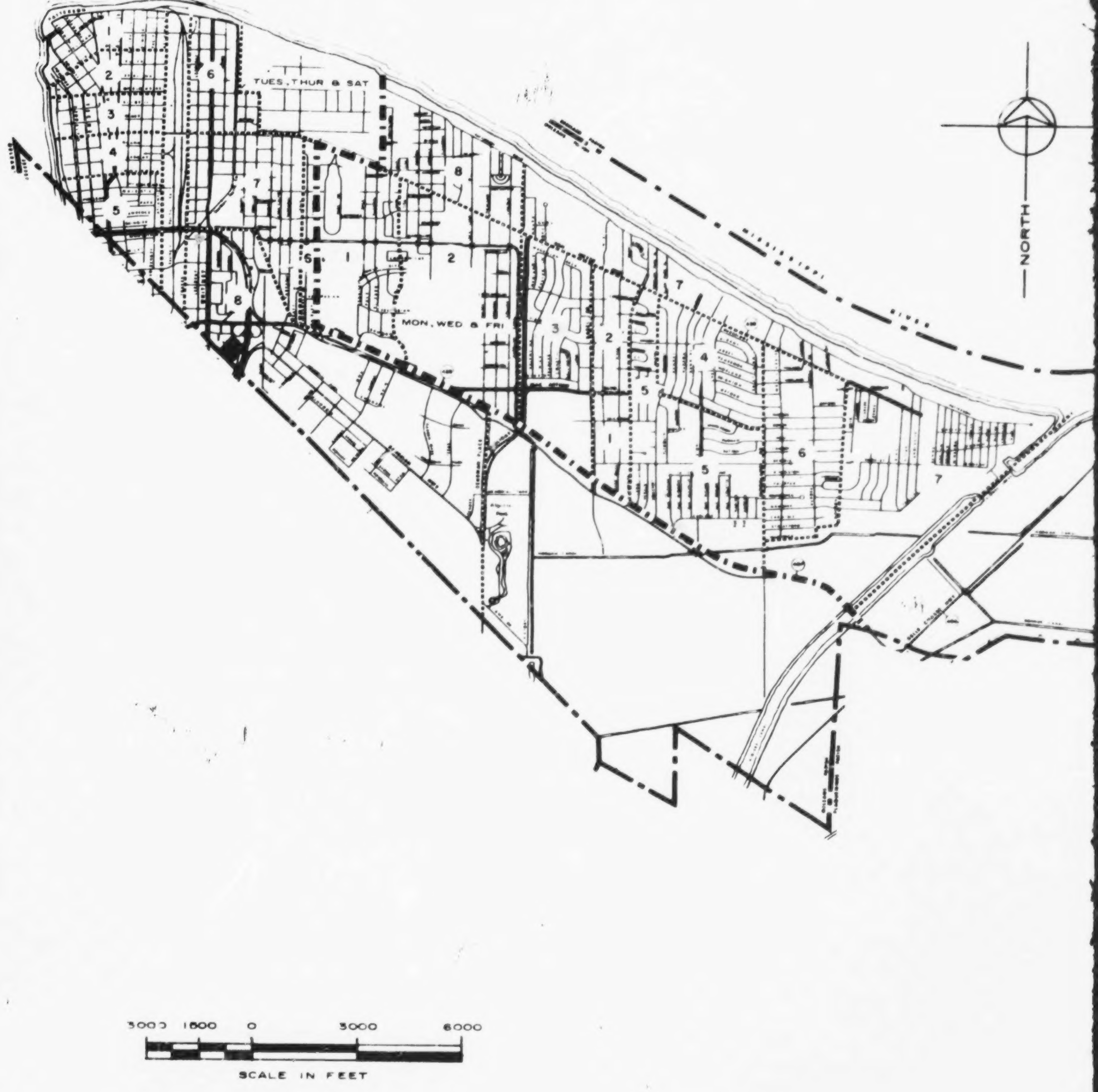

LITTLE WOODS
KE PONTCHARTRAIN
23
22
21
MON WED & FRI
TO VENETIAN ISLES
21
2
3
17
18
19
20
INTRACOASTAL WATERWAY

EXISTING EASTERN II DISTRICT

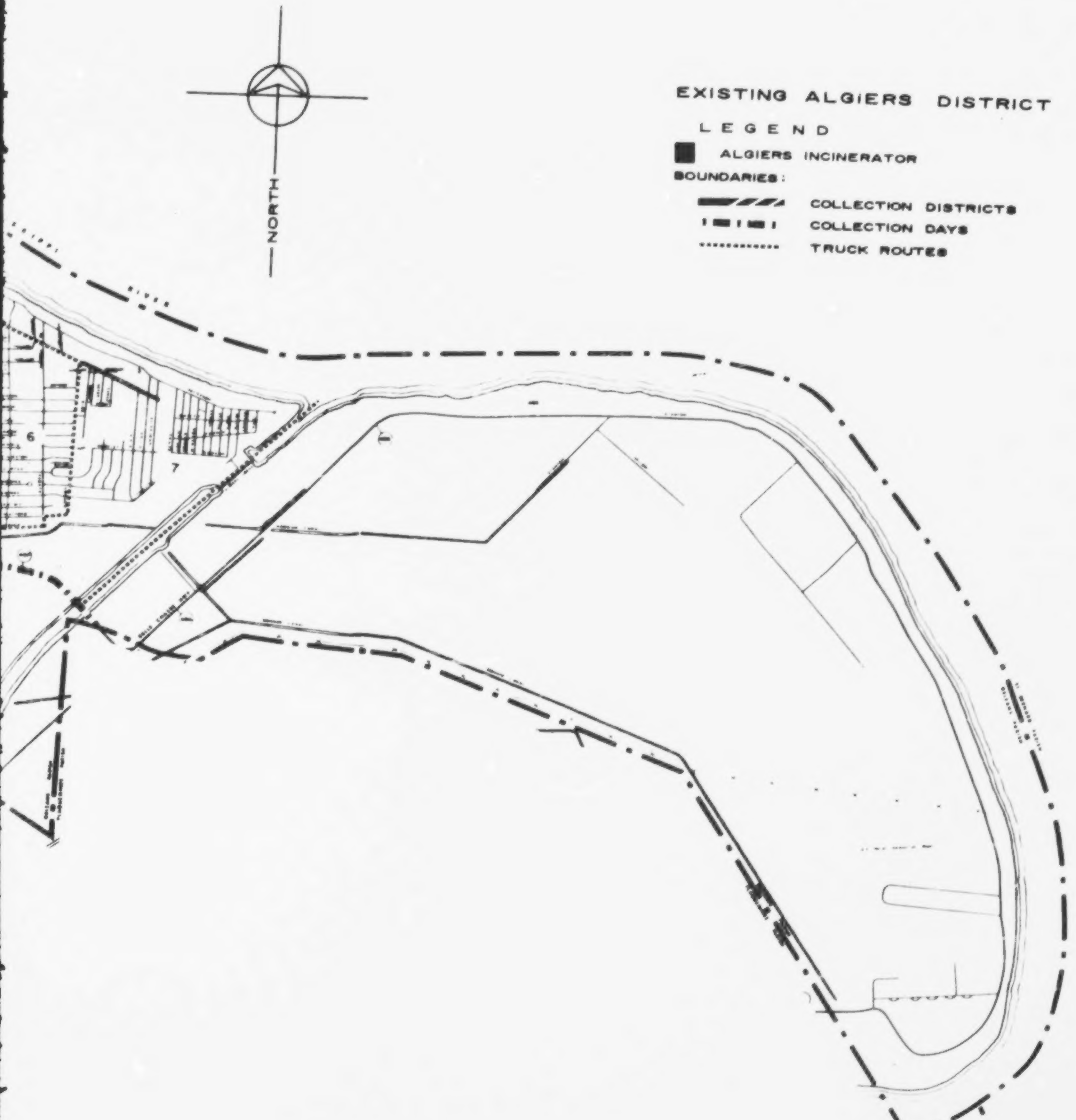
LEGEND
■ N. O. EAST INCINERATOR
BOUNDARIES :
COLLECTION DISTRICTS
COLLECTION DAYS
TRUCK ROUTES

B

FIG. V-5


TUES, THUR & SAT
MON, WED & FRI
1
2
3
4
5
6
7
8
1
2
3
4
5
6
7
8
NORTH
MISSISSIPPI RIVER
3000 1500 0 3000 6000
SCALE IN FEET

A


NORTH
EXISTING ALGIERS DISTRICT
LEGEND
ALGIERS INCINERATOR
BOUNDARIES:
COLLECTION DISTRICTS
COLLECTION DAYS
TRUCK ROUTES
6
7

B

FIG V-6

based at the St. Louis Incinerator Garage. Collection equipment for both the Night and Central Districts are based at the Seventh Street Incinerator Garage. Collection equipment for both Eastern I and Eastern II Districts is presently based at the Florida Avenue Incinerator Garage. Upon completion of the New Orleans incinerator, construction of garage facilities is planned for location of the collection equipment of Eastern II District.

Communications with all district offices and disposal facilities are provided by telephone and radio networks. The Sanitation Department operates on its own radio frequency from its departmental control station in the City Hall. Another control station is established at the Maintenance Garage. Departmental managers and first-line field supervisors and some operators are equipped with mobile units. Portable transmitters are also available for assignment for emergency or special communication needs.

Preventive maintenance, routine servicing, and minor repairs to the collection equipment are handled at facilities in the respective district garages. Major repairs are handled at the City Garage in downtown New Orleans.

The collection vehicle fleet consists of 125, 20-cubic yard, side loading, Hobbs "Hyd-Pak" packer units with International and Ford chassis of 1962 to 1966 vintage. Each collection route is serviced with a packer unit. In addition to the packer fleet, each district is assigned two trash trucks and one dog truck. The trash trucks and dog trucks assigned to each district are utilized principally for complaint calls on oversized waste, missed collections, and pick up of dead animals. Table V-9 presents a summary of the operating equipment assigned to each of the collection districts.

Past operating experience with the side loading trucks has been favorable from the viewpoint of initial cost and service life. However, the department now has on order five rear loading Heil Mark III packers on International Model C-0190 chassis. Rear loaders have certain advantages such as added protection and reduced lifting height for the collectors when loading. It is hoped by the Department that this new type of equipment may help reduce accident and employment turn over ratios of

TABLE V-9
1968 COLLECTION FLEET ASSIGNMENT

MANUFACTURE AND TYPE	CY CAP	YR.	PRICE	Central	Western	Eastern I	Eastern II	Algiers	Night	TOTAL
Garbage Fleet:										
International-Hobbs Hyd-Pak	20	60	$ 7,000	2						2
Ford -Hobbs Hyd-Pak	20	60	7,000	1						1
International-Hobbs Hyd-Pak	20	61	8,500	2					2	4
International-Hobbs Hyd-Pak	20	62	9,000	5	3	4	2	3		17
International-Hobbs Hyd-Pak	20	62	7,608	1				2		3
International-Hobbs Hyd-Pak	20	62	7,57[illegible]				2			2
Ford -Hobbs Hyd-Pak	20	63	7,[illegible]0	1		2	2	1	1	7
International-Hobbs Hyd-Pak	20	64	6,480	8		11	1			20
International-Thiele Pak	20	64	6,480				10			10
International-Hobbs Hyd-Pak	20	65	7,142		25					25
Ford -Hobbs Hyd-Pak	20	65	6,575	7				2		9
International-Hobbs Hyd-Pak	20	65	7,211		4	9	9	3		25
TOTAL Packer Fleet				27	32	26	26	11	3	125
Number of Daily Routes				22	28	22	23	8	*8	111
Fleet Reserve-Number of Units										14
Fleet Reserve-Percent										12.6%
Trash & Dog Trucks:										
International-Packer	20	65	$ 7,000	1						1
International-Packer	20	61	8,500				1	1		2
Ford -Dump		65	3,017		1	1				2
Ford -Dump		66	2,870	1	1	1	1	1		5
International-Dump		66	1,500	1		1		1		3
TOTAL Miscellaneous Vehicles				3	2	3	2	3	*0	13
TOTAL Investment in Present Fleet										
Route Trucks			$908,774							
Misc. Trucks			48,884							
TOTAL			$957,658							

*Night District also utilizes equipment of Central District

the collectors and provide increased efficiency in collection. This new equipment at about $12,000 per unit exceeds by one-third of the cost of the side loaders. Should this type of equipment prove satisfactory the Department plans replacement of the collection fleet.

e. Special Collection Services

In addition to the collection districts and routes serviced regularly in the New Orleans area, the Department also maintains a special container service for waste collection. This service is handled under the supervision of the Incinerator Support Section. Twenty-nine locations at public and semi-public installations within the City are provided with this service. A total of some 44 containers varying in size from two to eight cubic yards each are presently in use. The type of collection vehicles servicing this container operation is the Dempsey Dumpster. A listing of facilities receiving this service is indicated in Table V-10, together with container sizes and frequency of pick up.

f. Work Schedule

The scheduled work week of the collection districts consists of six days of variable hours depending on the workload. The collection crew on each truck consists of a driver and two collectors. The crews normally leave the district garages at 6:00 in the morning on work days and complete their routine collections in a nominal six to seven hour period. When the areas (routes) assigned are completed and refueling and cleaning of equipment is performed, the work day is also completed, regardless of the hours required. The basis of pay for drivers and collectors is a flat daily rate for each route, which provides the incentive to get the job done as quickly as possible.

Prior to the latter part of 1967, collections were made on all holidays, with the exception of Christmas. A policy change in late 1967 modified the collection procedure to exclude collection activities on all City holidays. This policy change in effect would reduce the normal annual work days from 312 to 303 days.

g. Collection Records

The Sanitation Department has been maintaining a comprehensive record system of waste collection since January 1966. The 1966 records also incorporated the best estimates available for the year 1965 for comparison purposes. Some 80% of solid waste collected by the Sanitation Department during this period of time has been delivered to the municipal incinerators which are equipped with scale facilities. In these cases, recorded quantities of wastes have been based on scaled weights.

TABLE V-10
INCINERATOR SUPPORT CONTAINER SERVICE COLLECTION

Location	Collection District	Collection Frequency	Containers	
			No.	CY
City Hall	Night	Daily	1	2
Civil Court	Night	Daily	1	2
Juvenile Court	Night	Daily	1	2
Traffic Court	Night	Daily	1	2
Auditorium	Night	Daily	7	2
Masonic Cemetery	Western	2/WK	1	4
Yatch Harbor	Western	MWF	1	4
Police Harbor	Western	MWF	1	4
Propeller Club	Western	MWF	1	4
Coast Guard Station	Western	MWF	1	4
Audubon Park	Western	TTHS	1	4
Gumbel Old Folks Home	Algiers	2/WK	2	4
Port of Importation	Eastern I	MWF	1	4
Riverview School	Eastern I	TTHS	1	4
Little Sisters of Poor	Eastern I	TTHS	1	4
St. Patrick Cemetery	Western	2/WK	2	4
New Library	Night	TTHS	1	8
Police	Western	Daily	1	8
Wildlife and Fishery	Night	Daily	1	8
French Market	Night	*2/Day	8	8
Prytania Private School	Eastern II	MWF	1	8
Power Squadrom	Western	TTHS	1	8
S.P.C.A.	Eastern I	TTHS	1	8
St. Claude Apts.	Eastern I	MWF	1	8
Goodwill Industries	Central	2/WK	1	8
Police Riding Academy	Western	MWF	1	8
Pontchartrain Beach	Eastern II	TTHS	1	8
St. Louis Cemetery	Night	TTHS	1	8
Mount Olivet Cemetery	Eastern II	2/WK	1	8

Maximum - Weekly container capacity 1,484 cy or about 185 tons
Avg. daily collection 247 cy or about 31 tons
Avg. daily tonnage collected by each truck about 15.5 tons

Nominal - 1967 collection records indicate actual collections of 6,430 tons or an average daily tonnage of 20.6 tons

* 7 days per week (all other daily service is 6 days per week)

Weekly route cards are maintained for recording daily collections and activities of each route, including crew hours worked, number of loads collected per day, a scale record of the weight of each load, and total mileage (where odometers are in operation). Mechanical breakdown, hours and reasons of breakdown, are also recorded daily. This record is maintained by the driver and the scaleman at the point of disposal. The weekly summary of individual route activities is compiled either by the section foreman or the district foreman. The weekly records provide required information for compiling the monthly summary of activities.

h. Cost of Refuse Collection

Records were obtained from the Sanitation Department of collection costs for the period of 1965 through 1967 and budget allocations for 1968. In evaluating these records we find that total collection and haul costs are equivalent to about 55% of total annual costs of the municipal solid waste system. Total social and fringe benefits (including annual leave, sick leave, holidays, and terminal leave) are equivalent to about 25% of direct productive payroll costs. During this three-year period total labor costs including benefits have averaged approximately 74% of the total collection costs.

A summary of the annual costs of collection and haul appears in Table V-11, which also shows total tons of refuse collected, cost per ton, and number of collection vehicles for each respective year. Anticipated costs are also shown for the 1968 budget year.

TABLE V-11
TRENDS OF COLLECTIONS AND HAUL COSTS (1965 - 1968)

Division of Operating Costs	Actual Costs			Estimated Costs
	1965	1966	1967	1968
Labor and Fringe Benefits	$1,600,790	$1,809,282	$1,912,129	$1,990,348
Fuel, Repairs, Maintenance	317,368	460,760	475,706	501,283
Licenses and Insurance	20,907	27,232	27,402	27,523
* Depreciation (Allowed)	127,600	166,300	166,300	174,200
TOTAL Annual Operating Costs	$2,066,665	$2,463,574	$2,581,537	$2,693,354
TOTAL Tons Refuse Collected	253,552	267,779	270,567	
Collection and Haul Cost per Ton	$8.15	$9.20	$9.55	
* Number of Collection Vehicles	102	134	134	125

The increase in collection and haul cost from 1965 to 1966 was due primarily to wage rate increases and additions to the collection fleet. In 1965 a limited number of trucks were in operation often doubling-up daily on route assignments. With the increase in the number of trucks in 1966, annual depreciation expense as shown increased substantially.

A reasonable leveling off of collection and haul costs was experienced in 1966 and 1967, resulting in an increase of only 3.8% in the unit cost per ton. Budget allocations for 1968 are predicated on this indicated trend. Collection costs are expected to continue to increase gradually due to annual salary increases and higher equipment maintenance and operating costs.

A further analysis of the present collection and haul costs of $9.55 per ton (see Table V-11) is presented later in this Chapter breaking down the collection and haul components respectively at 72% and 28% of total costs. This ratio indicated that for each ton of waste handled, a cost of $6.87 for collection and $2.68 for haul is incurred. Based upon present methods of collection and an incentive wage basis, it appears that any possible economies to be found will most likely occur in the haul component of these costs.

Costs of collection and haul experienced by New Orleans compares favorably with cost statistics available from other cities. Table V-12 shows this comparison and it is of interest to note that the collection component is substantially lower than other cities.

TABLE V-12
COMPARISON OF MUNICIPAL COLLECTION AND HAUL COSTS

City	Year	No. Coll./wk	Cost Per Ton Collection	Haul	Total
Los Angeles	*1965	2	$ 8.49	$4.25	$12.74
Washington, D. C.	*1965	2	NA	NA	14.11
Philadelphia	*1965	1	8.13	2.70	10.83
Pittsburgh	**1966	1	14.82	2.62	17.44
Providence	**1965		NA	NA	7.67
NEW ORLEANS	1967	3	6.87	2.68	9.55

*1965 PHS Survey ** Engineering Studies

Note: Pittsburgh has backyard collection, all others curb and alley.

Recommendations made under the Analysis of Collection and Haul, covered later in the report, propose certain changes in the route system whereby economies in haul time may be achieved without changing present service to which the public is accustomed. Also, possible reduction in frequency of service merits consideration as a means of reducing costs. This topic is discussed in more detail in the following section.

4. Frequency of Municipal Refuse Collection

The frequency of municipal collection of household refuse varies in different communities, depending on the amount, characteristics of the waste produced, climate, mode of payment, and to a certain extent, on the demands of the citizens. It follows that the more frequent the collections the more convenient it is for the residents. However, economic factors should also be considered so that a proper balance is often difficult to establish.

The Manual on Refuse Collection Practice published by the American Public Works Association (APWA, Third Edition), sets forth the following criteria:

The maximum period between collections should not be greater than:

a. The normal time for the accumulation of the amount of refuse that can be placed in a container of reasonable size.

b. The time it takes fresh garbage to putrefy and to give off foul odors, under average conditions of storage.

c. The length of the fly-breeding cycle. Unwrapped garbage should be removed from the premises at regular intervals spaced according to the minimal time required for the development of flies from eggs to mature larvae. During the hot summer months this is frequently less than 7 days.

It is the consensus that most municipal agencies meet the above criteria as found in a survey carried out by the APWA in 1964 on the frequency of collection from residential areas by municipal forces covering 418 communities across the United

States. This survey revealed that 46.7% of the cities provide pick-up service once a week, 48.5% twice a week and 3.6% three times per week. It can be stated, therefore, that the practice among most cities in the country for municipally collected refuse containing garbage is on the basis of two collections per week or less.

Pursuing this matter further, we have prepared Table V-13 showing the frequency of collection and other pertinent data for several selected cities located in the southern sections of the U. S. having characteristics similar to those of New Orleans. Of the 17 cities selected, including New Orleans, 14 provide two or less collections per week, and the remaining three show three collections per week.

TABLE V-13
FREQUENCY OF REFUSE COLLECTION IN SELECTED SITES
(From "Refuse Collection Practice" - APWA, Third Edition)

City	Pop. in Thousands	1. System Used	2. Area Served	3. Collection Points	Frequency of Collection (Pick-up Per Week)												4. Method of Financing
					Combined Refuse				Garbage				Rubbish				
					Summer		Winter		Summer		Winter		Summer		Winter		
					Res.	Com.	Res.	Com.	Res.	Com.	Res.	Com.	Res.	Com.	Res.	Com.	
Los Angeles, California	2,479	M.P.	R.C.I.	A.C.	1		1			2		2					T. E.
San Diego, California	523	M	All	A.C.	1	5	1	5									G.T.
San Diego County, Cal.	225	P	All	C	2	5	2	5									
Phoenix, Arizona	439	M.P.	R	A	2		2										G.T.
Tucson, Arizona	213	M.C.	R.C.I.	A.C.	2	R	2	R									G.T.
Corpus Christi, Texas	168	M.P.	All	C.R.	3	6	3	6									S. C.
Dallas, Texas	673	M.P.	All	A.C.R.O.	2	R	2	R									G.T.
Fort Worth, Texas	366	M.P.	R.C.M.	A.C.R.O.	2	R	2	R									
Beaumont, Texas	119	M	All		3	R	3	R									T. C.
Austin, Texas	187	M.P.	All														S. C.
Savannah, Georgia	140	M	All	V					2	R	2	R	1	1	1	1	G.T.
Miami, Florida	292	M.P.	All	R		R		R	2		2		1	1	1	1	G.T.
Dade County, Florida	500	M.P.	All	R		R		R	2		2		B		B		S. C.
Tampa, Florida	276	M	All	A.C.R.					2	R	2	R	B				S. C.
Ft. Lauderdale, Florida	100	M	All	R	2	R	2	R									G.T.
Baton Rouge, Louisiana	153	M	R.C.I.	A.C.					2	6	2	6	1	1	1	1	G.T.
New Orleans, Louisiana	657	M.P.	All	V	3	3	3	3									G.T.

CODING
1. Systems Used M = Municipal, C = Contract, P = Private
2. Areas Served R = Residential C = Commercial, M = Manufacturing & Industrial, I = Institutional & Public
3. Collection Points A = Alley, C = Curb, F - Front of house; R = Rear of house; V - All four collection points used, O = Other
4. Method of Financing GT = General Tax, SC = Service Charge; TC = General Tax & Service Charge

If the City of New Orleans were to reduce the collection of refuse from the present three to two times per week, the savings to be realized from this move are difficult to estimate accurately but it would probably be in the neighborhood of 10 percent of the cost of collection. Nonetheless, since the citizens have been receiving this service for several years for which no direct charge is made, any reduction of the frequency of collection would be strongly resented unless a solid well-organized campaign of selling the public on this change is undertaken.

In summary, we feel that should the rise in operating costs become unreasonable the City may consider the possibility of reducing the frequency of service to offset costs and be more in line with the practice in most large southern cities.

5. Municipal Waste Disposal

Observations of disposal practices indicate that in 1967 about 477,400 tons of waste were handled by municipal disposal facilities of which 44% or 196,000 tons were incinerated with the balance being deposited in the municipal landfills operated by the City.

a. Brief Description of Disposal Facilities

Prior to January 1968, the Sanitation Department of the City of New Orleans operated three incinerator plants and two landfills for disposal of solid wastes.

The Algiers Incinerator, with a rated capacity of 200 tons per day, is located in the Westbank community of Algiers at the intersection of the Westbank Expressway and Victory Drive.

The Seventh Street Incinerator, with a rated capacity of 400 tons per day, is located in the southern section of the City, midway between Claiborne Avenue and St. Charles Avenue on Seventh Street.

The Florida Avenue Incinerator, with a rated capacity of 400 tons per day, is located in the north central portion of the City of New Orleans, at Florida Avenue and Elysian Fields Avenue.

The landfills presently in operation are the Algiers landfill, a 57-acre tract, located in the extreme southern portion of Algiers on the Westbank immediately adjacent to the Plaquemines Parish line and the Gentilly landfill, a 34.7-acre tract, located on old Gentilly

Road approximately one mile west of Paris Road. Each of these properties are leased from private owners on a year-to-year basis. Lease costs are limited to the amount of City and State taxes.

Two new incinerator plants are being added to the disposal system in 1968. Renovation of the St. Louis Incinerator, located on St. Louis Street and N. Derbigney Street only one block north of Clairborne, is near completion. The rated capacity of the plant is 450 tons per day. During the past year this plant has seen limited use, in the function of a transfer station. Concurrently with the preparations of this report, New Orleans East Incinerator, with a rated capacity of 400 tons per day, is complete and undergoing burning tests. This entirely new facility is situated on a 5-acre site on old Gentilly Road about three miles west of Paris Road.

Adjacent to this new plant, a vacant tract of approximately 15 acres owned by the City is reserved for the deposit of incinerator residue.

The District Map, Figure I-1 (backcover) illustrates the location of the above mentioned disposal facilities, as related to the six collection districts. Detailed evaluations of each of the municipal disposal facilities are set forth later in this Chapter.

b. Present Assignment of Use by Collection Districts

Utilization of the municipal disposal facilities in 1967 by the six collection districts is shown in Table V-14.

Changes in the utilization of disposal facilities by the various collection districts will occur as soon as the New Orleans East and St. Louis Incinerators are in operation. This redistribution, in accordance with the methods set forth in the Haul Study will provide substantial economies in haul costs to the Collection Division.

c. Policies of Use of Disposal Facilities

The major user of the incinerators at present is the Sanitation Department of the City. The sites are fenced with entrance gates for control and

TABLE V-14

COLLECTION DISTRICT ASSIGNMENT TO DISPOSAL FACILITIES

District	Disposal Facilities Used	Collections Received
Central	Seventh Street Incinerator	100%
Western	Seventh Street Incinerator	25%
	Algiers Incinerator	65%
	St. Louis (Transfer Station)	10%
Eastern I	Florida Avenue Incinerator	100%
Eastern II	Florida Avenue Incinerator	20%
	Gentilly Landfill	80%
*Night	Seventh Street Incinerator	100%
Algiers	Algiers Incinerator	60%
	Algiers Landfill	40%

*Alternate location - St. Louis (Transfer Station)

prior to 1968 only limited deliveries of refuse were accepted from private and commercial vehicles, free of charge. Commencing in 1968 all commercial vehicle deliveries will be subject to a disposal charge on a tonnage basis. Private vehicles with household refuse will continue to be admitted without restriction or charge. Similar policies of use will be placed in effect at landfill sites in 1968.

Disposal facilities are open to the public seven days a week during daylight hours. Control of access at the incinerators is reasonably adequate, however, at the landfills control is more difficult after normal work hours due to inadequate lighting, lack of fencing, and the remote locations.

d. Weighing Facilities and Use Charge

Prior to 1968, weighing facilities were available only at the incinerators. Scale installations were completed during the latter part of 1967 at the landfills and it is now an effective policy to weigh all waste deliveries at all points of disposal.

Simultaneously with the installation of scales at landfills a new use charge was conceived as a means of producing revenue for the City. The established rate of charge (for wastes delivered by commercially licensed vehicles) effective January 1, 1968, is one dollar ($1.00) per 1,000 pounds or fraction thereof when delivered to any landfill, and one dollar ($1.00) per 500 pounds or fraction thereof when delivered to any incinerator.

e. Disposal Plant Facilities

(1) Emergency Fire Protection

Fire control equipment (hoses and fire extinguishers) is available at all incinerators and arrangements with municipal fire fighting agencies have been made to assist in major emergencies. Maximum distances from incinerator locations to the fire stations are three miles. Landfills are not equipped with an adequate water supply to control fires in their early stages, therefore, principal fire control, rests with the heavy equipment such as bulldozers.

(2) Support Equipment

Each of the disposal facilities is assigned the necessary support equipment for a self-contained operation under normal conditions.

Each incinerator is assigned from two to three ash trucks of adequate size to meet their peak requirements in residue hauling. These are shown in Table V-15. Heavy equipment such as bulldozers, graders, etc., as assigned to landfills is shown in Table V-16.

(3) Operational Maintenance

Crew members at the incinerators handle normal repair and service requirements of the plant equipment. Expendable spare parts are stored at each site. Major repairs are performed by personnel from the City

TABLE V- 15
NUMBER OF ASH TRUCKS ASSIGNED TO INCINERATORS

Truck Description	Cap. (c.y.)	Year	Price	Fla. Ave.	7th St.	Algiers	St. Louis	N.O. East	Total
Diamond T - Dump	16	62	$15,000		1	1			2
International - Dump	16	63	15,000		1	1			2
Diamond T - Dump	20	64	12,594	2			3		5
Diamond T - Hiele Dump	20	65	14,186	1	1				2
International - Hiele Dump	20	65	13,050			1			1
International - Hiele Dump	20	68	14,864					2	2
Total Ash Truck Fleet				3	3	3	3	2	14
Total Investment in Fleet			$194,120						

TABLE V-16
1968 EQUIPMENT ASSIGNMENT AT LANDFILLS

Location	Description	Year	Price	No. of Units
Gentilly Landfill	EIMCO Model 103C Tractor Cummins CR 160 Diesel Engine	1964	$ 26,520	2
	Caterpillar D7 Tractor (#173 AyD. Control 7A Bulldozer Blade)	1965	37,132	3
	P & H Crane 255 ALC w/Dragline	1958	30,941	1
	Koehring Comb. Drag	1952	10,000	1
	International Harvester	1951	800	1
Algiers Landfill	Caterpillar D7 Tractor (#173 HyD. Control 7A Bulldozer Blade)	1965	37,132	1
	TOTAL EQUIPMENT INVESTMENT		$243,309	

Yard and Shop which maintains a labor pool of approximately 45 men of various skills. Priority has been established with this shop for servicing incinerator plants in case of emergency breakdown. Major repairs and service to rolling equipment at both incinerator and landfill locations are provided by the facilities of the City Garage presently operated by the Sanitation Department. During 1968 it is anticipated that major repairs will be handled by the newly organized Central Garage facility. Details of this arrangement are presently being resolved.

4) Area Sanitation

Reasonable sanitary conditions are maintained within the incinerator plants, although violations of good sanitary practices occur on the aprons adjacent to the pits. Often this condition is caused by overloading and infrequent cleanings of the storage pits. The Board of Health reportedly sprays the pits daily, however, long retention of wastes in these pits contributes to the problems of sanitary control with the presence of flies, birds, and rats not uncommon.

Landfill operations are conducted as open dumps with area sanitation a major problem at both locations. Open burning occurs frequently at the Algiers location whereas underground fires are more prevalent at the Gentilly landfill where unburned wastes are compacted and covered. Cover material is limited in supply and must be hauled into both locations. Neither location is operated in a manner that meets the accepted standards of sanitary landfills.

5) Salvage and Scavengers

Salvaging at disposal points is officially banned, however, this policy is not strictly enforced. Existing salvage and scavenging operations, although apparently not interfering with the disposal operations, are detrimental to "good housekeeping" practices, especially at the incinerators.

Local observations indicate the minor salvage and on-site storage practices permitted to incinerator personnel are the principal cause of the littered appearance evident at the various plants. If this practice were discontinued and basic housekeeping and maintenance practices made mandatory, morale should improve and greater plant efficiency can be expected.

f. Waste Disposal Records

Daily operating records maintained at both incinerators and landfills are forwarded to the Department offices for analysis by management. The daily records include cumulative totals of each activity, as well as personnel reports of each shift. These daily records are used as control measures on labor costs (budgeted personnel and payroll), as well as evaluation of daily operational conditions at each plant concerning daily tonnage received from municipal and private trucks, tonnage of refuse burned, residue removed, and remaining floor tonnage. An operational cost section illustrating in detail the cost of labor, maintenance, and fuel required to operate the facility is also included in the report. From the total cost, a cost per ton is calculated. Weather, refuse, and residue conditions are recorded since they also have a direct effect on solid waste disposal and disposal cost. These daily reports together with furnace charts are retained in permanent record files on each plant.

The Chief Administrative Office in 1965 adopted the Performance Type Budget (PTB). Monthly Performance Reports in support of the budget are compiled from the daily operating records. This report provides a monthly summary of activities for each location and comparisons to the same period of the previous year and provides a means for review and analysis of program alternatives.

In early 1968 a data processing system was designed to provide accurate recordings of all wastes delivered at each of the disposal facilities. This system initially conceived to facilitate billing procedures of commercial accounts was broadened to encompass activities of all vehicles and users of the municipal disposal facilities. Seven Standard Registers (source-record-punch) Model 1601 were installed at the disposal sites for this recording activity. In order to simplify the billing of fees, a credit record procedure similar to credit cards was devised by the Department of Finance. Application for credit cards is made through the Sanitation Department. Predesigned punch cards (charge forms) used with the credit cards are used to record net weight and identify type of refuse for billing purposes. If a person does not have a credit card the machine operator writes his name, address, and license number of vehicle on the blank charge card. White (original) copy is given to customer, and other two copies are retained by machine operator. Charges are billed monthly to the owner of the licensed vehicle or credit card holder thereby eliminating the handling of cash. The Sanitation Department anticipated further use of the punch card machines and with cooperation of EDP was able to set up a program which would not only record information necessary for billing purposes but also additional record data pertinent to the Department. All municipal trucks, including garbage, ash, and trash trucks of the Sanitation Department are assigned cards to be presented at the disposal site. The punch cards are forwarded to the Department offices where they are segregated and sent to EDP for final analysis. Here the information becomes input to the IBM Computer Model 30. Output in the form of monthly statistical reports and customer billing is timely.

The programmed computer can by means of card sorting obtain various combinations of desired information. Statistical data can be acquired as to tonnage collected per route and district, tonnage of combustible and non-combustible collected, and tonnage detail received at each disposal facility. A monthly print-out is made of the six collection districts and each disposal facility. The monthly summary for disposal facilities includes tonnage and types of material received from City, State, and Federal agencies, and commercial and private sources. With application of data processing to the Department it is hoped to eliminate redundant paper work and also assure accurate and concise data. This system now in its first month trial period (May 1968) is expected to produce records that will be invaluable to management in planning and controlling within the Department.

g. Cost of Disposal

Evaluation of the Sanitation Department cost records for 1967 indicate disposal through operation of incinerators and landfills was equivalent to about 36% of the total annual cost of the solid waste system. Budget allocations for 1968 project costs for solid waste disposal (incinerator and landfill) at an estimated 41.8% of total budgeted cost. The projected increase of some $523,000 for 1968 is due principally to the assumed full operation of both St. Louis and New Orleans East incinerators as well as expected increases in labor rates. The summary of the total annual cost for solid waste disposal as experienced by the

Department in 1965, 1966, and 1967 is illustrated in Table V-18. This table, illustrating in detail the costs of disposal by both incineration and landfill, resolves all costs to a cost per ton basis, ranging from a low of $0.45 per ton at the Algiers landfill to a high of $6.91 per ton at the Algiers incinerator.

The per ton cost for both the Florida Avenue and the Seventh Street incinerators shows a sharp increase for 1967 over the two previous years due principally to the smaller tonnage handled at each of these plants. This was largely due to more downtime for repairs. Based on the quantities burned in two previous years the $5.57 per ton shown for the Florida Avenue Incinerator should have been about $4.80 per ton and the $4.87 per ton shown for the Seventh Street Incinerator should have been about $4.25 per ton. The lesser cost per ton at the Seventh Street Incinerator, even though the total annual costs are 15 and 30 per cent higher than at Florida Avenue and Algiers effectively demonstrated the advantage of the larger plants. This is shown graphically on Figure V-7 on which is also shown the cost for the 600 and 900-ton plants proposed later in this report.

Table V-17 shows the breakdown of incinerator costs for each of the three incinerator plants operated in 1967 as well as the 1968 budgeted cost breakdown for St. Louis and New Orleans East incinerators. Brief operating experience in 1967 of the St. Louis Incinerator, as well as current experience at the New Orleans East Incinerator reasonably justifies that budgeted figures for these two plants are realistic. In practice each of these five incinerator plants incur similar gross payroll costs in their annual operation.

Excluding both St. Louis and New Orleans East incinerators, the total labor cost (including benefits) for the three year period (1965-67) averaged approximately 58.9% of the total incineration cost per ton. St. Louis and New Orleans East incinerators are expected to be operated at a labor ratio of about 45-50% of total costs.

The variations of landfill operations present a low unit cost of $0.45 per ton in Algiers where open burning is conducted and $1.27 per ton at the Gentilly landfill which is operated as an open dump, without burning being practiced.

TABLE V-17
INCINERATION COSTS (1967-1968)
(Cost Per Ton)

Division of Operating Costs	ACTUAL COSTS 1967			ESTIMATED COSTS 1968	
	Florida Ave.	Seventh St.	Algiers	St. Louis	New Orleans East
Labor and Fringe Benefits	$3.45	$2.77	$4.01	$1.55	$1.65
Utilities, Fuels, Maintenance Repairs, Lic. and Insur.	1.22	1.06	1.33	.49	.42
Sub-Total	$4.67	$3.83	$5 34	$2.04	$2.07
*Depreciation and Amortization	.90	1.04	1.57	.88	1.50
TOTAL COST PER TON	$5.57	$4.87	$6.91	$2.92	$3.57
Capacity of Plant (Tons/Day)					
Rated Capacity	400	400	200	450	400
Effective Capacity	200	270	150	410	365

*Includes straight line depreciation of ash trucks (6 yr. life) and amortization of plant (20 yr. life @ 3 1/2% interest)

FIGURE V-7
COST PER TON TO INCINERATE IN RELATION TO PLANT SIZE

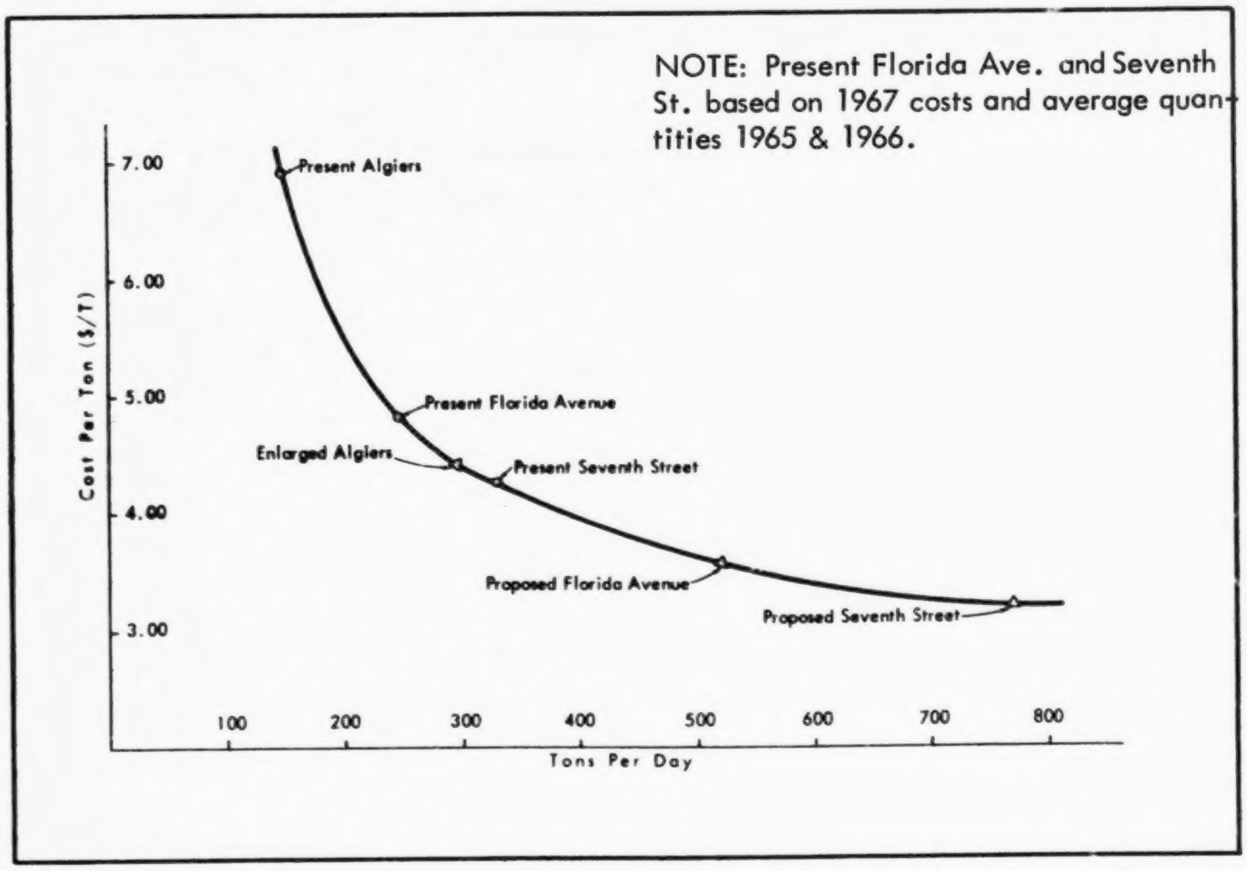

NOTE: Present Florida Ave. and Seventh St. based on 1967 costs and average quantities 1965 & 1966.

TABLE V-18
BREAKDOWN OF COST OF REFUSE DISPOSAL AT VARIOUS FACILITIES FOR THE YEARS 1965, 1966, and 1967

	Year	Incinerator and Landfills				Vehicular Equipment				Total Annual Oper. Cost	Tons Incinerated or dumped	Cost Per Ton
		Labor, Inc. Fringe Benefits	Utilities Elec. and Gas	Repairs	Amortization 20 years at 3 1/2%	Licenses & Insurance	Gas & Lube.	Maintenance	Amortization 5 years			
		($)	($)	($)	($)	($)	($)	($)	($)	($)		($)
INCINERATORS:												
Florida Avenue	67	223,790	6,647	55,566	47,806	509	4,536	12,000	10,500	361,354	64,835	5.57
	66	214,144	10,196	52,095	47,806	484	2,271	9,975	10,500	347,471	75,845	4.58
	65	175,070	10,212	43,617	47,806	490	2,064	8,000	10,500	297,759	75,062	3.97
Seventh Street	67	235,999	19,463	48,612	78,307	494	9,299	12,000	10,500	414,674	85,181	4.87
	66	214,144	18,702	39,559	78,307	488	3,406	9,975	10,500	375,081	98,185	3.82
	65	179,558	16,388	42,045	78,307	479	3,069	8,000	10,500	338,346	99,730	3.39
St. Louis*	67	76,808	33,943	6,575	75,507	498	8,618	9,000	9,875	220,824	5,691	N.A.
Algiers	67	185,878	10,974	34,142	65,660	479	4,309	12,000	7,000	320,442	46,382	6.91
	66	158,626	13,438	31,176	65,660	473	2,271	9,975	7,000	288,619	43,382	6.65
	65	151,876	17,510	23,562	65,660	468	2,064	8,000	7,000	276,140	40,480	6.82
Incinerator Support (All Incinerators) **	67	98,471	--	796	--	1,321	12,928	36,000	31,500	181,016	196,398	0.92
	66	94,642	--	1,262	--	1,300	6,812	29,925	31,500	165,441	217,412	0.76
	65	91,276	--	217	--	1,299	6,812	24,000	31,500	155,104	215,272	0.72
LANDFILLS:												
Gentilly	67	118,526	386	1,862	--	1,395	12,960	60,000	25,792	220,921	174,000	1.27
	66	126,900	556	3,143	--	1,363	6,812	49,875	25,792	214,441	--	--
	65	114,469	404	2,346	--	1,358	12,385	40,000	25,792	196,754	--	--
Algiers	67	32,114	232	1,361	--	211	2,592	8,978	3,095	48,583	107,000	0.45
	66	29,230	162	541	--	200	1,135	8,579	3,095	42,942	--	--
	65	28,430	321	979	--	200	1,032	8,000	3,095	42,057	--	--

*Not in full Operation

** See Table V-22, Page V-43 for detailed breakdown

The above cost data includes all operating and capital costs of these plants and in the case of incinerators, includes both labor and equipment costs for residue removal. These costs specifically exclude those portions of Incinerators' Support costs (covered in the next section of this report) applicable to transfer of wastes between incinerators or from incinerators to landfills.

Total departmental costs of disposal by incineration and landfill including transfer operations during 1967 averaged $6.55 per ton based only on that tonnage collected by the City or an average of $3.70 per ton for the disposal of all municipal and private collections handled at the City facilities. This latter overall cost, showing a great reduction in the unit price for disposal, is of course due to the high percentage of commercial wastes handled by landfill.

In review of total disposal costs by incineration the individual cost of residue removal was investigated to some extent. The present method of handling quenched residue at each incinerator is by direct discharge from conveyors and hoppers to 16 or 20 cubic yard diesel powered dump trucks. Records of the Sanitation Department indicate that a total of 97,962 tons (wet weight) of residue was removed from the three operating incinerators (Algiers, Seventh St., and Florida Avenue) in 1967.

This volume required 11,089 truck loads to be hauled to the various landfill points. Based upon a 312 day operating year, average daily activity involved 35.5 roundtrip hauls to remove 314 tons of residue. Three trucks are assigned at each incinerator. These nine trucks each averaged approximately four loads per day with 8.7 tons per load.

Haul distances from each incinerator to points of disposal vary. With Algiers and Seventh Street incinerators delivering residue to the Algiers landfill their respective roundtrip haul distances are estimated at 10 and 18 miles requiring an estimated 45 minutes roundtrip haul time from Algiers incinerator and 105 minutes from Seventh Street. Florida Avenue incinerator delivering to Gentilly landfill has an estimated roundtrip haul distance of 12 miles requiring an average roundtrip haul time of 60 minutes.

1967 records indicate 3,325 roundtrips were from Algiers, 4,477 trips from Seventh Street and 3,287 trips from Florida. Based upon haul distance and time requirements for each load from the respective incinerators, combined annual mileage of these nine trucks servicing these incinerators was 153,280 miles requiring 13,616 truck operating hours excluding loading time. It follows that each truck averaged about 17,000 miles per year and 1,513 operating (haul time) hours or 54.5 miles and 4.85 operating hours per 24 hour work day.

Department records indicate that the annual cost of operation of each truck is about $15,600. This cost includes payroll (with social and fringe benefits) of $9,550, insurance and licenses at $250, capital cost (6 year equipment life) $2,345, maintenance and repairs at $2,440 and fuels, oil, and lubrication at $1,020 ($0.06 per mile).

With these nine trucks in operation, total annual costs of $140,400 were incurred in 1967 for residue removal at these three plants, or it may be expressed that an average cost of $1.43 per ton was experienced in the removal of residue. Relating this total cost to the gross volume of 196,400 tons of waste burned at these three plants indicates a unit cost of $0.71 per ton of waste incinerated or approximately 13% of total incineration costs.

It should be noted that average daily haul time of 4.85 hours per truck represents only 20% of the availability of truck time or total daily truck costs. The balance of time is consumed by "down-time" in the loading cycle and maintenance and repairs which contributes to the high unit cost experienced.

h. Support Services Common to Collection and Disposal Divisions

The Incinerator Support division functions as an independent service in both collection and disposal activities. As noted earlier, this division provides container collection for public installations and utilizes front-end loading (fork lift) compactor trucks in this service.

In addition to this responsibility, the division also provides the transfer operations needed at the St. Louis incinerator, and at other incinerators during prolonged breakdowns. Transfer of wastes may occur either between incinerators or between incinerators and landfills. During the year 1967 about 43,735 tons combustible wastes, or 16% of total municipal collections were handled in this operation, representing an average of about 140 tons per day. The quantities removed from each of the incinerator plants during this period are shown in Table V-19.

TABLE V-19
TRANSFER OF COMBUSTIBLE WASTES (1967)

Incinerator	Tons
St. Louis (Transfer Station)	24,160
Florida Avenue	10,425
Seventh Street	9,000
Algiers	150
Total Waste Transferred	43,735

A large portion of this material was transferred to the somewhat distant landfill by the Incinerator Support equipment consisting of transfer trailers (compactors) and diesel tractors.

This division also provides transfer service of oversize and non-combustible wastes from the incinerator plants to the landfills which in 1967 amounted to about 2,215 tons or 1% of total annual collections. Three 20-cubic yard diesel powered vehicles are utilized for this transfer operation. Table V-20 shows the quantities handled from each plant in 1967.

TABLE V-20
TRANSFER OF OVERSIZE AND NON-COMBUSTIBLE WASTES (1967)

Incinerator	Tons
St. Louis (Transfer Station)	80
Florida Avenue	0
Seventh Street	1,065
Algiers	1,070
Total Transferred	2,215

The equipment assigned to Incinerator Support for performance of both, collection and transfer operations for 1968, is shown in Table V-21.

TABLE V-21

FLEET ASSIGNMENT TO INCINERATOR SUPPORT (1968)

Truck Description	Capacity (C.Y.)	Year	Price	No. of Units
Transfer Equipment:				
International Tractors	-	64	$ 11,312	3
Hobbs Hyd-Pak Transfer Trailer	53	64	14,777	2
Hobbs Hyd-Pak Transfer	60	64	15,679	2
Diamond T -	20	67	13,750	3
Container Service Equipment:				
Diamond T - Hydro Ex-Pak	20	64	14,950	1
International - Dumpmaster	20	63	16,000	1
Total Equipment Investment:				
Transfer Equipment			$136,098	
Container Service Equipment			30,950	
Total Investment			$167,048	

In addition to the foregoing, Incinerator Support also provides services within the Sanitation Department and other municipal departments not directly connected with collection and disposal of wastes. In 1967 costs of special project assignments outside departmental activities were estimated to be equivalent to 15% of the total annual costs incurred by this division. The nature of these projects range from removal of abandoned automobiles for the Police Department to assistance to other departments in clearing and preparing City land for various uses. Another 5% of the annual costs in 1967 were attributable to hauling of dirt, rock, and leafage stockpiles resulting from street sweeping operations. This material was hauled to City owned property (parks, etc.) for fill material.

A total cost of $181,000 was incurred in 1967 by the Incinerator Support division for performance of all services. A breakdown of this cost appears in Table V-22 which shows, in addition, the estimated unit costs and amounts of waste materials handled for the entire year.

TABLE V-22

BREAKDOWN OF INCINERATOR SUPPORT COSTS - 1967

Service	Tons Handled	Est. Cost Per Ton	Total Cost
Container Collection	6,430	$6.00	$ 38,580
Transfer Combustible Material	43,735	2.30	99,855
Transfer Oversize and Non-Combustible Material	2,455	3.00	7,365
Total Collection and Transfer Costs	52,620	$2.77	$145,800
Special Assignments			27,150
Hauling Miscellaneous Materials			9,066
Total Other Costs			$ 36,216
Total Division Costs - 1967			$181,016

Table V-23 provides a summary of total annual operating expenses such as labor and fringe benefits, maintenance and repairs, etc. as incurred in 1967 and projected for 1968. Economies are expected to be achieved in the future from reduced transfer of combustible materials, when St. Louis and New Orleans East incinerators go into full operation.

TABLE V-23
INCINERATOR SUPPORT ANNUAL OPERATING EXPENSES

Division of Operating Expenses	1967 Actual Costs	1968 Proj. Costs
Labor and Fringe Benefits	$ 98,471	$ 86,603
Fuel and Lubrication	12,928	13,228
Repairs and Maintenance	36,796	38,996
License and Insurance	1,321	1,319
Amortization of Equipment (5 years)	21,500	31,500
Total Annual Costs	$181,016	$171,646

6. Emergency Operations

Specific policies, preparations, controls, personnel, and equipment are employed during times of disasters and emergencies, when called upon by local, state, or federal direction. The Department has appointed eight key men as the nucleus of the emergency team on call 24 hours a day, each with the responsibility of assembling assigned personnel at a designated emergency station in the event of disaster alert. These stations located throughout the City consist of the various branch facilities of the Department.

City Hall - Sanitation Department Central Offices
Seventh Street Incinerator
St. Louis Incinerator
Florida Avenue Incinerator
City Yard & Shop
City Maintenance Garage
New Orleans East Incinerator
Algiers Incinerator

Various types of departmental equipment are assigned to these locations. In all, these emergency stations are equipped and manned with approximately 186 men, 123 pieces of equipment, 29 radio-equipped vehicles, and 10 portable radios.

Emergency operations are controlled from the Sanitation Department central offices with liason and communications with Civil Defense Headquarters, American Red Cross, Police Department, other emergency agencies, and the facilities of the eight Department emergency stations.

In severe emergencies, such as the not uncommon area hurricane conditions, this Department's first responsibility is evacuation. All mobile equipment is decontaminated upon notice of hurricane alert conditions for use as may be required.

Once hurricane conditions have passed and emergency evacuations completed, this Department joins with other agencies in clearing debris in the area. In some cases the Department is not able to dispose of contaminated garbage, spoiled foods, and debris at the regular disposal facilities due either to breakdowns of incinerators or excessive amounts of refuse and debris at these locations. In the case after Hurricane Betsy in 1965, seven additional dumps were opened to accept the estimated 136,500 loads of mixed garbage, trash, trees, etc. Reactivation of former dumps or designations of new emergency dump locations can readily be obtained by the Department in case of emergency needs.

7. Comments on Operation of the Sanitation Department

In the foregoing sections we have reported on the organization and operation of the Sanitation Department as the result of more than eight months of detailed study of its operation, during which time we have developed certain opinions and conclusions which we believe should be set forth in this report. Our comments are as follows:

a. The basic responsibilities with which the Department is charged are clearly defined and its organizational structure defines the scope of duties for each major function or division.

b. Weekly staff meetings provide good communication with first line supervisors in all divisions.

c. Salary levels together with fringe benefits under the Civil Service system are generally in line with prevailing area rates for the various classifications and respective skills required.

d. The subdivision of the City into six collection districts for refuse collection, each under a district foreman, represents a sound practice in that it limits collection areas to a reasonable size for supervising and policing.

e. The provision of an incinerator to serve each collection district reduces collection costs to a minimum by reducing travel distance and time to and from the point of disposal.

f. The garaging of collection vehicles at the incinerator sites reduces dead running time and permits better crew control.

g. With the short haul to the point of disposal in each collection district, the collection vehicle of 20-cubic yard capacity is adequate.

h. The use of rear loading packer trucks recently purchased will reduce the lift that is required to load the truck from that required by the present side loading trucks thus reducing the efforts required by the collector.

i. Packer trucks should be of the type that unload with a pusher plate to avoid strain on the truck chassis and facilitate unloading.

j. The present practice of obtaining the weight of refuse in each vehicle delivered to either an incinerator or dump as well as the practice of identifying the truck route and collection district for each Sanitation Department vehicle should be continued.

k. Type and format of records maintained by both Collection and Disposal Divisions appear adequate and generally concise.

l. Our study of these records indicate the need for improvement in accuracy and completeness in their preparation.

m. Information concerning both collection and disposal should be summarized monthly and the information analyzed to ensure an equitable distribution of the work between the crews and control of the overall operation.

n. The substantial differences between the quantities collected by crews working in adjacent areas as disclosed by our survey should be further investigated by analysis of the records over a longer period and by field observations.

o. Consideration should be given to raising the pay scale of the section foreman to ensure a higher scale than that of the personnel under their supervision.

p. Consideration should also be given to increasing the car allowance for foremen required to use their own cars in connection with their jobs to ensure adequate supervision.

q. The general appearance of the three regularly operating incinerators, Florida Avenue, Seventh Street, and Algiers, could be substantially improved by better housekeeping and a regular program of preventive maintenance.

r. The increasing degree of complexity and mechanization of the newer incinerators beginning with Algiers, St. Louis, and New Orleans East as well as those proposed hereunder require a carefully planned and executed program of regular preventive maintenance to minimize costly breakdowns in equipment and interruptions in plant operation.

s. An adequate budget allowance under which regular maintenance can be accomplished including the renewal or replacement of equipment is a necessity for a program of preventive maintenance.

t. The present budget of the Sanitation Department is unrealistic and inadequate to provide for proper maintenance and contributes to plant neglect and lack of pride of the operators.

u. Personnel requirements should be reviewed on the newer incinerators and qualifications and pay rates established commensurate with the duties required.

v. Efforts being made to provide an effective safety program to reduce vehicular and occupational accidents are vital and should be further emphasized. The safety programs introduced at the various plants should be more vigorously enforced and employees required to use safety equipment provided for their protection. The requirement that all collection employees wear safety shoes should be rigidly enforced.

B. Quantities and Types of Refuse

1. Present Quantities - Municipal and Private

In order to determine the present quantities of waste generated within the City, records for the years 1965, 1966, and 1967 were examined. These records included the weight of all materials delivered to the incinerators and estimated weights for both the Gentilly and Algiers Dumps.

In order to verify these records, a field survey was made covering the first two weeks in December. For this purpose, scales were installed at both of the municipal dump sites. During the survey a man was stationed at each scale to check the weights, as well as the source and types of refuse. The weights thus determined were checked against the City records and related to the annual production. In the case of the incinerators, the correlation was excellent and as the results the City's records were adopted without correction. Estimates of weights made at both dumps, however, proved to be grossly in error. The Gentilly Dump records showing several times more refuse than determined by survey while the Algiers Dump records were somewhat less than that indicated by the survey. Survey figures projected to reflect annual coverage figures were adopted for this portion of the record.

In addition to the City dumps, the New Orleans Disposal Co. operates a large landfill within the City. This is the only major commercial disposal facility in the City receiving any substantial quantities of refuse. A similar two-week survey was made at this dump and the volume and amounts of the different type of refuse were estimated.

We find the total refuse production in New Orleans amounts to 1,950 tons per day (7-day week) of which 43% is collected by municipal forces and the remainder by private disposal concerns and demolition companies. Generally, the latter collects all waste from commercial and industrial enterprises and that generated from the port facilities. The total quantity of refuse, expressed in terms of per capita production, amounts to 5.69 pounds per day, which is about 25% higher than the national average. A breakdown of our findings into combustible and non-combustible refuse is shown in Table V-24 which includes the per capita figures for each classification. It should be noted that the amounts recorded in the Table as Municipal refuse include that collected by other public agencies in addition to the Sanitation Departments.

TABLE V-24
TOTAL REFUSE PRODUCTION (1967)
(7-Day Week)

	Combustible per Day		Non-Combustible per Day		Total per Day	
	Tons	Lbs/Cap	Tons	Lbs/Cap	Tons	Lbs/Cap
Municipal	750	2.18	75	0.22	825	2.40
Private (Ind., Comm., Port, etc.	610	1.78	115	0.24	725	2.12
Demolition and Construction			400	1.17	400	1.17
TOTAL	1,360	3.96	590	1.73	1,950	5.69

The regular refuse collection service provided by the City through its established collection routes is largely limited to the collection of combustible refuse, i. e., that which can be charged into an incinerator. Special crews are used for the collection of oversize and non-combustible refuse, i. e., that which cannot be charged into an incinerator.

2. Forecast of Future Waste Production

Records show that nationally the per capita production of refuse has increased from 2.7 lbs. per day in 1920 to 4.2 lbs. in 1960 and forcast projections anticipate a steady continuing increase as disposable items come into greater use. A similar situation has been experienced by the City so that approximately 15% increase per decade in per capita production over the next twenty years has been adopted in this report in forecasting future refuse quantities.

Based on the above criteria, it is expected that the present per capita production of 5.69 lbs. per day will reach 7.69 lbs. by 1990 which amounts to 3,610 tons per day distributed as shown on Table V-25 The national average as estimated by APWA for that year is 6.4 lbs. per capita.

TABLE V-25
FORECAST OF TOTAL REFUSE PRODUCTION
(7-Day Week)

Year	Population	Lbs/Cap/Day	Tons/Day
1967	687,170	5.69	1,950
1970	713,500	5.81	2,080
1980	822,000	6.69	2,750
1990	937,000	7.69	3,610

3. Characteristics of Waste

As previously mentioned, most household refuse produced in the City is collected by Sanitation Department forces. Except for oversize and special wastes this refuse is delivered to the incinerators, as much as it is possible to do so and within the availability of incinerator capacity. As additional incinerator capacity becomes available it is expected that all combustible and household refuse, with some exceptions, will be incinerated.

In order to determine the composition of the waste presently delivered to the incinerators, samples of such refuse were collected for five consecutive days and analyzed. A summary of the test appears in Table V-26 which shows the results of the average 5-day sampling and includes moisture content and the calculated calorific values for the various components. The samples were collected during a dry period. (See Appendix VI for Sampling Procedures)

a. Incinerable Refuse

Under this heading we have included all refuse which would be acceptable for burning at an incinerator. Amounting presently to 1,310 tons per day, it includes some non-burnable materials such as glass, cans and other metals which are normally found in household refuse. Our survey revealed that municipal collection accounts for approximately 55% of the total combustible refuse produced in the City and it is expected that this proportion will remain fairly constant over the years.

b. Non-incinerable Refuse

In the New Orleans area non-combustible waste must be considered in two separate classifications. That which makes satisfactory fill material and, therefore, presents no problem in that it may be in demand in the

TABLE V-26

PHYSICAL COMPOSITION OF REFUSE
CITY OF NEW ORLEANS

(Averages of 5-day Sampling)

Classification of Components	Percent Composition Wet Weight Basis	Percent Moisture	Calorific Value* (BTU/Lb.) (As Delivered)	Calorific Value* (BTU/Lb.) (Dry, Ash-Free Basis)
Combustibles:				
1. Garbage	18.9	39.5	5,900	9,800
2. Garden Trash	9.2	39.2	5,500	9,350
3. Paper Products	39.4	10.5	7,150	8,000
4. Rags	2.6	4.9	7,600	8,000
5. Plastic & Misc.	1.5	-	16,000	16,000
Total Combustibles	71.6	21.3		
Non-Combustibles:				
1. Glass	16.2	-		
2. Misc. Metals & Cans	12.2	5.9		
Total Non-Combustibles	28.4	3.1		
Total	100.0	16.2**	4,890**	5,890**

* Dry Basis, values from Proceedings, 1964 National Incinerator Conference. Appendix B & C, Page 46-47.
As Delivered, values reduced to moisture content shown.
** Weighted Average

Note: See Appendix VI for sampling procedures and other data.

area for filling low ground. Under this heading is included most demolition waste and some forms of industrial wastes. Since they present no problem and are frequently disposed of by the contractor or industry producing them, reliable estimates of the amounts of such waste are difficult to obtain. Ash and incinerator residue from a properly operated incinerator are also in this classiffication.

The second category includes waste which cannot be used as fill material such as discarded or abandoned vehicles. In the New Orleans area some of these are processed as scrap and the remainder are a problem which was covered in Chapter III. Old refrigerators, stoves, large pieces of furniture, bedsprings, stumps, logs, timbers, and similar materials including some auto bodies, cannot be incinerated without special handling. Such materials will continue to be dumped in landfills where they can be crushed, compacted, and covered for disposal.

c. Industrial and Commercial Waste

Field observations made in December 1967 of the activities at both municipal and private disposal facilities, reasonably established the gross tonnage of wastes being delivered to incinerators and area landfills. These observations also provided a breakdown between municipal and private wastes delivered to these locations. However, as a means of providing further detail of private wastes produced in the area, that is, type and composition as well as major producers and methods of disposal not revealed by the field observations, a direct mail survey of industry and commerce was undertaken. The support of the Chamber of Commerce of Greater New Orleans was obtained in launching this survey covering some 2,100 selected firms in the Tri-Parish area (about 1,700 within New Orleans, 300 in Jefferson, and 100 in St. Bernard). This direct mail approach together with follow up via telephone (to more than 100 firms) and mail produced a response of about 30%. This percentage of replies, though low, was reasonable considering the broad range and number of business firms initially solicited. Review of the initial mailing list and replies indicates that representative coverage of the major industrial and commercial firms was obtained.

Table V-27 summarized 453 replies from firms solicited in New Orleans and illustrates the number of firms utilizing the various methods of collection or disposal listed. A sample of the questionnaire is included in Appendix IV. Excluding those firms receiving municipal collection and those which provided incomplete replies, the resulting number (about 84%) was considered pertinent to further analysis. Table V-28 covers quantities and types, i.e., combustible and non-combustible wastes reported by these 381 firms.

TABLE V-27
METHODS OF COLLECTION AND DISPOSAL OF COMMERCIAL AND INDUSTRIAL WASTES

	No.	% Replies Received
Firms Solicited	1,686	
Firms Replying (by 2/15/68)	453	
Municipal Collection	71	15.7
Collection by Private Contractor	259	57.2
Haul Own Trucks	82	18.1
On-Site Incineration	25	5.5
Combination of Methods	15	3.3
Incomplete Reply	1	.2

TABLE V-28
QUANTITIES AND TYPES OF WASTES REPORTED

Method of Collection or Disposal	No. of Firms	Tons per Week		
		Comb.	Non-Comb.	Total
By Private Contractor	259	730.3	122.0	852.3
Haul Own Trucks	82	81.5	15.8	97.3
On-Site Incineration	25	3.5	.2	3.7
Combination of Methods	15	*	*	*
Total	381	815.3	138.0	953.3
Avg. Tons Daily (6 Day Wk.)		135.8	23.1	158.9
Percent of Total (Tons/Day)		85.6	14.4	100.0

*Included above

By comparison, our December field observations at all disposal points indicated a total of 725 tons per day from private commercial and industrial sources with 610 tons per day (84.2%) combustible and 115 tons/day (15.8%)

non-combustible material, which compares very favorably with the material classification from replies to the mail survey. However, comparison of quantities based on percentage of replies to total firms solicited does not appear to be a reliable method of evaluation of total wastes generated.

To correlate the point of origin of the wastes reported in the survey, to the collection districts of the Sanitation Department, we prepared Table V-29 which presents distribution of quantities, types and percent of total wastes by district, as well as percentage distribution of the firms reporting.

TABLE V-29
DISTRIBUTION OF REPORTED PRIVATE WASTES

Collection District	% of Firms Report	Tons Per Week					Avg. Tons /Day	% of Total
		Comb.	%	Non-Comb.	%	Total		
Central	14.5	57.2	7.1	16.6	12.1	73.8	12.3	7.7
Western	19.3	246.3	30.2	37.2	26.9	283.5	47.3	29.7
Eastern I	5.0	34.1	4.2	1.4	1.0	35.5	5.9	3.7
Eastern II	8.9	131.2	16.1	33.1	24.0	164.3	27.4	17.5
Algiers	1.2	1.2	Tr.	.7	.5	1.9	.3	Tr.
Night	51.0	345.3	42.4	49.0	35.5	394.3	65.7	41.4
Total	100.0	815.3	100.0	138.0	100.0	953.3	158.9	100.0

The principal points of disposal as indicated by the replies were private landfills, with municipal landfills receiving only 32.0 tons/day and municipal incinerators 4.5 tons per day.

The composition of the combustible materials reported included paper, cardboard, carton, wood, plastics, cloth and food wastes. Considerable variations in the combinations of materials occurred in the replies, with paper products predominantly high in the order of quantities. Other combustibles reported less frequently were leather, rubber, grass, lint, etc. Principal non-combustibles consisted of metals and glass. Occasionally, limited quantities of oversize wastes, such as discarded appliances, furniture, machinery, defective and damaged plumbing fixtures were reported. Also, large quantities of waste materials were reported, such as those from a gypsum producer with 50 tons of waste per day, and a plumbing fixture manufacturer with wastes in the form of broken pottery molds producing about 40 tons per day. Special wastes of this nature have been excluded from the foregoing summaries of combustibles and non-combustibles as this type of material does not present a major disposal problem in the area, being disposed of normally in landfill developments.

d. Port Wastes

Of principal interest and application to our study of Metropolitan Wastes, is the determination of the quantities and types of wastes produced in the port facilities, the origin, their point of disposal and projection of the increasing quantities of wastes to be expected.

In 1965 a comprehensive study entitled "Wharf Refuse Collection and Disposal" was prepared for the Board of Commissioners, Port of New Orleans by Godat and Pepper, Consulting Engineers, New Orleans. This study was concerned with all aspects of collection, removal, and disposal of dunnage and other refuse accumulating in the wharf areas, from transfer of incoming and outgoing cargo between ships and rail or motor freight carriers. It will be noted that the scope of this study is confined to those public facilities operated by the State and excludes coverage of wharfage operated by private industry.

In the study, quantities of wastes were determined through evaluation of field observations taken over a four-month period which included weighing of trucks at the Algiers incinerator enroute to the Algiers landfill and daily collection records of the Dock Board. Wide fluctuations found in daily quantities of wastes generated varied with, the number and frequency of berthings, the tonnage of vessels serviced and the nature of cargo carried. The results of this study reasonably established the quantity of wastes produced in 1965 with projections of the annual level of wastes to be expected through the year 1985 based on increases anticipated at the rate of 5% per annum as shown in Table V-30.

TABLE V-30
ESTIMATED PORT WASTES 1965 - 1985
(tons)

Year	Annual	Weekly	*Daily
1965	6,864	132	22
1967	7,540	145	24
1970	8,736	168	28
1975	11,128	214	36
1980	14,228	274	46
1985	18,127	349	59

* 6-day week basis

It was estimated that 90% by weight of port wastes were combustible materials, consisting mostly of heavy wood scantling, timber, pallets, crates, boxes, building paper, and waste paper. Other miscellaneous combustibles included broken bales of produce, broken bags of coffee, grain, fertilizer, carbon black, rope, and plastics. Non-combustibles consisted of steel bandings, baling wire, nails, and bolts. Much of the combustible materials were found to be large and bulky, difficult to handle for disposal, either in a properly operated landfill or by incineration without first crushing or pulverizing. The practice of disposal of these materials was by open burning at the Algiers landfill.

Distribution of the origin of these wastes as produced in the wharf area is identified in the port study by wharf name and plotted by location. Orienting these wharfs and the respective quantities of waste produced in 1965 to the boundaries of the collection districts of the Sanitation Dept., as they exist today, we find the approximate distribution of tonnage as shown in Table V-31.

TABLE V-31
DISTRIBUTION OF PORT WASTES
(Tons)

*District	%	1965	**1967
Western	20	1,372	1,508
Central	25	1,716	1,885
Eastern I	25	1,716	1,885
Night	30	2,060	2,262
TOTAL	100	6,864	7,540

* Trace percentages (not shown occurred in Algiers and Eastern II Districts
** Assumed same percentage distribution as 1965

e. Demolition and Construction Wastes

1967 records show that 437 demolition permits were issued in the City. These included 143 single family units, 152 duplex buildings, and 56 buildings of other residential classification (triplex, fourplex, apartments, etc.). In total, 351 buildings containing 765 living units were demolished in 1967. The remaining 86 demolition permits issued covered all other classifications of buildings. However, small commercial buildings were most predominant in this group.

Table V-32 provides the complete listing of building types covered by 1967 permits.

Principal waste materials resulting from demolition projects include concrete and masonry rubble, plaster, roofing, lumber, wiring, piping, etc. A great portion of these wastes consists of non-combustible, hard fill materials, and of oversize wastes.

In New Orleans, as in other areas throughout the country, the salvage of bricks and other materials from demolished buildings is actively practiced to satisfy the growing demand in this market. Several specialized demolition contractors in the City compete for demolition projects which have large quantities of salvage material. Discussions with the major contractors revealed that a substantial amount of this type of material is also imported into the City from sources out of state to satisfy the local market demand.

Combustible materials such as wood, roofing, etc., are normally disposed of by burning at permitted locations within the City. Ordinarily, collection and disposal of such materials is handled by the demolition companies, or in some cases, especially on the larger projects, by private hauling contractors.

The general practice for disposal of non-combustible fill materials is through private hauling by individuals in need of such material for land development. Common practice in this area indicates that usable fill is loaded free of charge for removal from demolition sites. A considerable amount of this waste has gone to the outlying

TABLE V-32
1967 DEMOLITION PERMITS - CITY OF NEW ORLEANS

Building Type	No. Bldgs.	No. Living Units
Apartment Houses	11	
Dormitory	1	
Sororities	2	
Motel	1	
Single Family	143	143
Two-family	152	304
Triplex	11	33
Fourplex	16	64
Roominghouse	2	19
Theatre	3	
Public Elementary School	1	
Universities	2	
Churches	2	
Convalescent Home	1	
Orphanage	1	
Private Garages	2	
Carport	1	
Open Sheds	2	
Enclosed Sheds	6	
Factory	1	
Machine Shop	1	
Warehouses (Storage of Non-Combustibles)	23	
Lumber Yard	1	
Wholesale Store	1	
Retail Stores over 1000 sq. ft.	13	
Commercial and Residential	16	92
Restaurant	1	
Cocktail Lounge - Bar	1	
Bar and Restaurant	1	
Service Stations	5	
Repair Shop over 1000 sq. ft.	1	
Office Buildings	5	
Small Commercial Stores under 1000 sq. ft.	7	

areas in the northeastern section of Orleans Parish for filling marshland areas in this section of the City.

In order to arrive at an estimate in the amount of demolition waste produced in the City, we contacted some of the most active demolition companies in the area and reviewed the demolition permits issued by the Buildings Department in the City of New Orleans. It is estimated that the total amount of non-combustible demolition waste produced in the City of New Orleans in 1967 ranged between 100 and 150 tons per day, with the majority of this material being deposited in private fills for land development purposes.

In addition to demolition wastes, activities in new construction, as well as alterations and additions contribute a substantial quantity of non-combustible wastes from the construction industry. In 1967 some 4,000 building permits were issued in the City of New Orleans for new construction and alterations and additions to existing structures. It is estimated that non-combustible wastes from new construction activities (materials similar to those waste materials of demolition projects) ranged from 200 to 250 tons per day in the year 1967 Non-combustible wastes produced by these construction activities are also used in landfill developments.

Although it is the practice of most building contractors to handle disposition of their combustible wastes, large building contractors in the area, especially those operating in the central business district and on major projects such as hospitals, schools, etc., in the outlying sections, are looking more to the private hauler for the disposal of combustible wastes.

f. Refuse Collection by Sanitation Department

As previously mentioned, the Sanitation Department collects approximately 43% of the refuse generated within the City. For this purpose, the City of New Orleans is divided into six collection districts.

Data gathered in the field survey, supplemented by information obtained in the collection and haul study, made it possible to determine the quantity of combustible refuse collected by the City from each collection district, and also to determine the per capita production in each district. This breakdown was essential in developing the collection and haul study covered later in this Report, and is pertinent to the analysis of the refuse collection system of the City's Sanitation Department.

In order to determine future quantities of refuse to be anticipated from each district, population forecasts made by the Planning Department were correlated to the collection districts and applied to the per capita waste production projected to future years up to 1990.

Forecast of population in five-year intervals by collection districts is shown in Table V-33 together with our estimate of the total tons of combustible refuse expected from each district, based on the per capita production. It should be noted that the quantities shown have been adjusted to a 6-day week basis to conform to the operating schedule for both, the collection and disposal operation. Also, the collection districts for 1975 to 1990, except for the Algiers and Night Districts, have been modified in accordance with the First Stage Development Program discussed later in this Report.

g. Quantities of Refuse Delivered to Municipal Incinerators

In addition to the refuse delivered to each incinerator from the collection district by the Sanitation Department, private haulers account for much of the refuse from industrial, commercial, and multi-family residential units. Also, the Port Authority disposes of substantial quantities of refuse from shipping both into and out of New Orleans.

A summary of the estimated quantities of waste produced from each of these sources in each collection district from 1967 through 1990 is given in Table V-34.

TABLE V-33
REFUSE COLLECTED BY SANITATION DEPARTMENT BY COLLECTION DISTRICTS - 1967 - 1990
(6-Day Week)

Collection District	1967 Population	1967 Lbs. Cap. Day	1967 Tons Per Day	1970 Population	1970 Lbs. Cap. Day	1970 Tons Per Day	1975 Population	1975 Lbs. Cap. Day	1975 Tons Per Day	1980 Population	1980 Lbs. Cap. Day	1980 Tons Per Day	1985 Population	1985 Lbs. Cap. Day	1985 Tons Per Day	1990 Population	1990 Lbs. Cap. Day	1990 Tons Per Day
Central	182,760	1.92	176	184,060	1.96	180	225,250	2.00	225	229,000	2.10	240	231,750	2.28	264	234,750	2.47	290
Western	162,440	2.73	222	164,440	2.79	228	124,750	2.98	186	127,750	3.18	203	129,750	3.46	224	132,750	3.78	251
Eastern I	142,660	2.82	202	144,100	2.88	208	194,740	3.07	299	203,000	3.27	332	210,750	3.55	374	212,250	3.84	407
Eastern II	106,490	2.69	143	120,600	2.75	165	105,000	2.94	155	136,000	3.14	214	168,000	3.41	286	195,500	3.68	360
Algiers	50,160	2.15	54	57,000	2.20	63	68,000	2.35	80	79,000	2.50	100	90,000	2.72	123	110,000	2.94	162
Night	42,680	3.19	68	43,300	3.20	69	45,260	3.30	75	47,250	3.40	81	49,750	3.70	92	51,750	4.00	104
Total Population	687,190			713,500			763,000			822,000			880,000			937,000		
Weighted Average Lbs/Capita		2.52			2.56			2.66			2.85			3.10			3.36	
TOTAL Tons/Day			865			913			1,020			1,170			1,363			1,574

NOTES:
1. Population estimates for 1970, based on revised collection districts. (Figure V-8).
2. Population estimates for 1975 to 1990, based on future collection districts of the First Stage Development Program with Florida Avenue, Seventh Street and Algiers Incinerators enlarged and in service. (Figure V-14).

TABLE V-34
SUMMARY OF REFUSE PRODUCED IN EACH DISTRICT
(6-Day Week)

		1967	1970	1975	1980	1985	1990
Algiers:	Municipal	54	63	80	100	123	162
	Comm. & Ind.	60	70	92	110	139	184
	Port	-	-	-	-	-	-
Total Algiers Incinerator		114	133	172	210	262	346
Central:	Municipal	176	180	225	240	264	290
	Comm. & Ind.	144	147	190	197	213	228
	Port	6	7	9	11	14	17
Night:	Municipal	68	69	75	81	92	104
	Comm. & Ind.	56	56	61	68	75	80
	Port	7	8	10	13	17	20
Total Seventh Street Incinerator		457	467	570	610	675	739
Western:	Municipal	222	228	186	203	224	251
	Comm. & Ind.	118	120	122	130	142	152
	Port	5	6	7	9	12	15
Total St. Louis Incinerator		345	354	315	342	378	418
Eastern I:	Municipal	202	208	299	332	374	407
	Comm. & Ind.	130	133	184	200	227	245
	Port	6	7	9	11	14	17
Total Florida Avenue Incinerator		338	348	492	543	615	669
Eastern II:	Municipal	143	165	155	214	286	360
	Comm. & Ind.	95	105	110	150	204	255
	Port	-	-	-	-	-	-
Total N.O. East Incinerator		238	270	265	364	490	615

C. Analysis of Refuse Collection System

1. General

In order to properly evaluate the present system, it was necessary that we study the pick up and haul aspects of the refuse collection operations of the parish and thus, determine what modifications of the collection districts would be required to provide an effective system under present and future conditions.

2. Haul Study

The analysis comprises a comparison of the system under present operating conditions and that resulting from the addition of the New Orleans East Incinerator and the rehabilitation of the St. Louis Incinerator. The former is, at this writing, undergoing final tests and should be in operation shortly. The unit at St. Louis is expected to be in service within a year. Therefore, the present system consisting of three incinerators and two dumps, plus a transfer station at St. Louis, will be operating in the near future with all five incinerators in service. The dumps will be confined to absorbing non-combustibles from all sources and residue material from the incinerators.

The study is limited to the operations of the Sanitation Department and does not include private or other municipally collected refuse.

The existing collection districts were modified with respect to the five incinerators in operation on the basis of reducing, as much as it was possible to do so, the haul distance and time of the vehicles and of confining the service area of each incinerator to a collection district, except for the Central and Night Districts which will continue to share the Seventh Street Incinerator as they are presently doing. The general layout of the proposed system is shown in Figure V-8 (back-cover) and a detailed description is covered later in this section.

The Data Processing Department of the City provided valuable assistance in the evaluation of the large amount of information gathered in the survey. Data obtained in the field were adjusted to computer input form and a special program developed to carry out the necessary calculations of the study.

It was evident from the start that the five incinerators are excellently located with respect to the quantity of refuse production and the haul distances within their respective service areas.

The analysis of collection and haul operations was developed from actual field records collected with the cooperation of Sanitation Department personnel, from each truck route in each district. The total number of hours and mileage of collection and haul, as well as the tonnage collected, number of trips, etc., were recorded and evaluated. We were then able to calculate the average travel speed of the vehicles and the minutes-per-ton of collection for each truck route and for every collection day. The haul distances were then adjusted to the proposed collection districts with the five incinerators in operation. In the process of analysis, the total number of working hours and the travel speed of the vehicle were kept the same. In the latter case the only exception was in the evaluation of the revised Eastern II District where the Mon-Wed-Fri routes were assigned an average haul speed of 15 1/2 mph, to and from the New Orleans East Incinerator which is easily accessible through U.S. 90 most of the way. As would be expected, these routes recorded lower speeds when delivering to the Florida Avenue Incinerator due to the more congested area of travel.

It should be noted that the collection crews do not work any specified number of hours and perform their task as long as required to cover their respective areas, thus the actual number of working hours vary from day to day and from route to route. It was necessary, therefore, that in the process of analysis the total working hours recorded in each case be maintained constant when applied to the new conditions. Similarly, the calculated minutes-per-ton of collection was applied throughout, for each case.

It follows that the savings to be realized will be reflected in the reduction in haul time. It was found, for instance, that under present conditions the pick up crews average approximately 28% of the total working hours in hauling refuse and the remainder in collection. With the revised collection district, the haul time is reduced to 19% which, expressed in terms of haul cost, represents a decrease from $721,000 to approximately $490,000, or a savings of $231,000 per year, based on 1967 cost data. These savings can only be realized if any time available, as the result of the reduction in haul time, were applied to collection. By so doing, we find that the present collection crew could pick up an additional 93 tons of refuse per day within the same working hours. Since this additional tonnage represents an amount greater than that produced during the survey, it was necessary that the data be further reduced in terms of number of trucks required to serve each area and thus determine what reduction in the number of trucks would be obtained in each district. For this, it was necessary that the load per truck, per trip be maintained at, or less than the capacity of the vehicles, so in some instances additional trips were required. The corresponding increase in haul time for such cases were included in the analysis.

The data gathered in the survey together with the result of calculations and projection to future operating conditions, that is, all five incinerators in operation under a revised collection layout, appear in Tables A-8 through A-37 in Appendix II, together with a detailed explanation of Data Processing application.

Results of the data compiled and calculated are summarized in Table V-35, which shows a total savings of ten trucks in the number of vehicles required to serve the present areas by the same crew and within the same working hours. It should be noted that the Algiers and Night Districts remain at eight truck routes each, since normal conditions do not affect these districts, which will continue operating as presently.

Attention is directed to the fact that the analysis is confined to conditions presently existing when applied to a revised collection system that can be best served by the five incinerators. While future conditions will change as the City continues to grow, the survey provides valuable information on which realistic projections and estimates can be made.

TABLE V-35
SUMMARY OF COLLECTION AND HAUL STUDY
(Trucks/Day)

District	Number of Trucks Required - Five Incinerators in Service							Adjusted Average	No. of Trucks Presently In Use	Savings (Trucks/Day)
	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Total			
1. Central	20.5	22.0	20.0	22.0	20.5	22.0	127.0	21	22	1
2. Western	25.5	24.7	21.2	23.8	21.7	21.7	138.6	23	28	5
3. Eastern I	17.5	21.9	20.6	18.0	17.5	21.9	117.4	20	22	2
4. Eastern II	21.3	19.8	23.2	19.5	21.9	21.3	127.0	21	23	2
5. Algiers	8.0	8.0	8.0	8.0	8.0	8.0	48.0	8	8	0
6. Night	8.0	8.0	8.0	8.0	8.0	8.0	48.0	8	8	0
TOTAL	100.8	104.4	101.0	99.3	97.6	102.9	606.0	101	111	10

3. Revised Collection Districts to Serve Present Incinerators (1968)

The collection districts were modified and the disposal point of several truck routes rearranged in order to reduce haul distance and time and provide a more efficient and economical system within the limits of incinerator capacity. It would have been possible to maintain the districts as at present by confining the proposed changes to points of disposal for the truck routes only. This approach would have been impractical under the present operating scheme of the Sanitation Department, because trucks assigned to the same districts would unload at different locations and operate from different garages.

It has been the practice of the department to maintain the collection districts as separate units, each with its own vehicles and supervisory personnel operating from the same garage and unloading generally at the same incinerator or dump. We believe this method of operation to be sound and practical and the proposed changes in collection districts and truck routes maintains the present operating set up.

With the New Orleans East and the St. Louis incinerators in service, the logical distribution of the five-incinerator service areas is as follows:

District	Incinerator
Central	Seventh Street
Western	St. Louis
Eastern I	Florida Avenue
Eastern II	New Orleans East
Algiers	Algiers
Night	Seventh Street

The layout of the revised district is shown in Figure V-8 (backcover). It may be seen that the district boundaries, except for the Algiers and Night Districts which remain the same, have been adjusted by interchanging several truck routes from one district to another, but maintaining the boundaries of the present truck routes. Specifically, the modifications are as follows:

a. Central District

Increases from the present 22 to 26 truck routes, by relinquishing Routes No. 13 through 22 (Monday-Wednesday-Friday) to the Western District and picking up Routes No. 1 through 14, also 19, 21, 25, and 27 (Tuesday-Thursday-Saturday) from Western. In summary, it exchanges with the Western District, losing five and gaining nine truck routes, for a net gain of four.

b. Western District

The number of truck routes remains at 28, but they are rearranged. In the exchange with the Central District, as explained above, it loses four routes, but gains four from Eastern I, as follows: Routes 1, 2, 4, and 7 (Monday-Wednesday-Friday) and Routes 1, 3, 7, and 8 (Tuesday-Thursday-Saturday).

c. Eastern I

The number of truck routes is increased from the present 22 to 23 by relinquishing four to Western District as explained above, and picking up five from Eastern II as follows: Routes No. 8 through 12 (Monday-Wednesday-Friday) and Routes No. 7 through 10 and 12 (Tuesday-Thursday-Saturday).

d. Eastern II

The number of truck routes is reduced from the present 23 to 18, by losing five routes to Eastern I as explained above.

The aforementioned changes appear in Figures V-9 to V-12 which show the individual truck routes for each revised district and Table V-36 summarizes the exchange of truck routes among the collection districts. By applying the results of the haul study to the particular routes involved, we determined the number of trucks required in the revised collection districts. These appear in the same Table which shows the distribution of the total savings in number of trucks among the different districts.

TABLE V-36
PRESENT AND ADJUSTED NUMBER OF TRUCK ROUTES
REQUIRED BY DISTRICTS 1967 - 1968
(Trucks/Day)

DISTRICT	Present Operation	Recommended Reassignment	REVISED DISTRICTS (Five Incinerators in Service)		
			Adjusted	Required	Savings
1. Central	22	+4	26	24	2
2. Western	28	--	28	24	4
3. Eastern I	22	+1	23	20	3
4. Eastern II	23	-5	18	17	1
5. Algiers	8	--	8	8	0
6. Night	8	--	8	8	0
TOTAL	111	0	111	101	10

A breakdown of the specific truck routes assigned to each revised collection district is shown in the tables included with the above Figures. In these tables, each route is identified as to its number, day of collection, and the districts to which they are presently assigned. Also, the calculated number of trucks required for each route is shown.

In order to implement the reduction in truck routes, only those routes requiring less, or more, than one truck to serve their respective areas should be affected. The reduction may then be accomplished by combining portions of certain adjacent routes according to the tabulated values computed for each, and to the special characteristics of the area as determined by field investigation. This subject is covered further in the Summary at the end of this section. For more clarification as to the specific truck routes involved, they have been noted in Figures V-9 to V-12, where, in addition, all routes in each district are clearly identified.

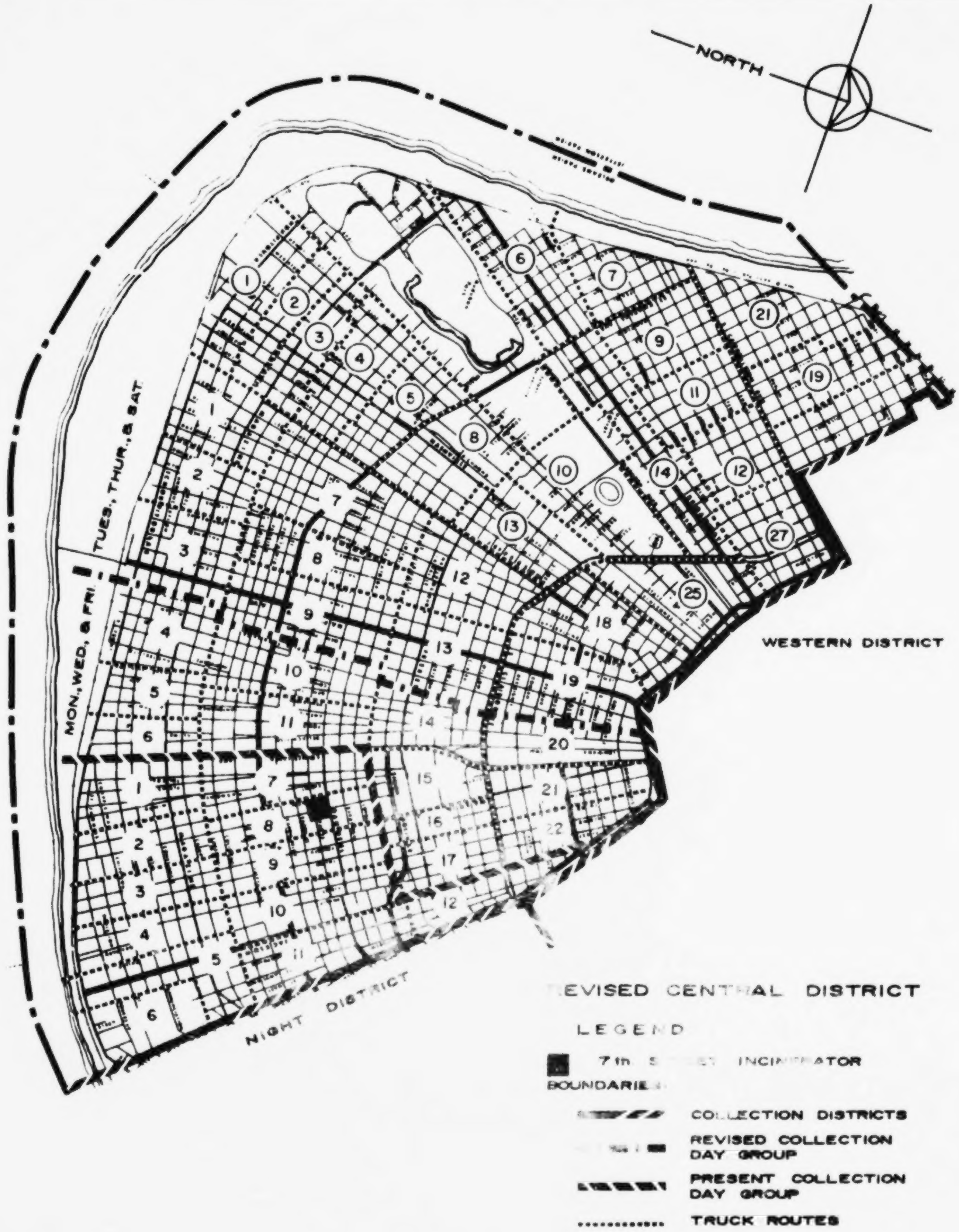
MON - WED - FRI COLLECTION				TUES - THURS - SAT COLLECTION			
Present Operation			No., Trucks Req'd.	Present Operation			No. Trucks Req'd.
Route No.	Day	District		Route No.	Day	District	
1	MWF	Central	1.00	1	TTS	Central	1.00
2	"	"	1.00	2	"	"	1.00
3	"	"	1.00	3	"	"	1.00
4	"	"	1.00	7	"	"	1.00
5	"	"	1.00	8	"	"	1.00
6	"	"	1.00	9	"	"	1.00
7	"	"	1.00	12	"	"	1.00
8	"	"	1.00	13	"	"	1.00
9	"	"	1.00	18	"	"	1.00
10	"	"	1.00	19	"	"	1.00
11	"	"	1.00	1	"	Western	.89
12	"	"	1.00	2	"	"	.77
4	"	"	1.00	3	"	"	.70
5	"	"	1.00	4	"	"	.79
6	"	"	1.00	5	"	"	.75
10	"	"	1.00	6	"	"	.75
11	"	"	1.00	7	"	"	.75
14	"	"	1.00	8	"	"	.84
15	"	"	1.00	9	"	"	.68
16	"	"	1.00	10	"	"	.79
17	"	"	1.00	11	"	"	.87
20	"	"	1.00	12	"	"	.82
21	"	"	1.00	13	"	"	.77
22	"	"	1.00	14	"	"	.79
				19	"	"	.86
				21	"	"	.81
				25	"	"	.86
				27	"	"	.87
TOTAL			24.00				24.36

Average 24.18
Use 24.00

NOTES:

A

ON
No. Trucks Req'd.
1.00
1.00
1.00
1.00
1.00
1.00
1.00
1.00
1.00
1.00
.89
.77
.70
.79
.75
.75
.75
.84
.68
.79
.87
.82
.77
.79
.86
.81
.86
.87
24.36

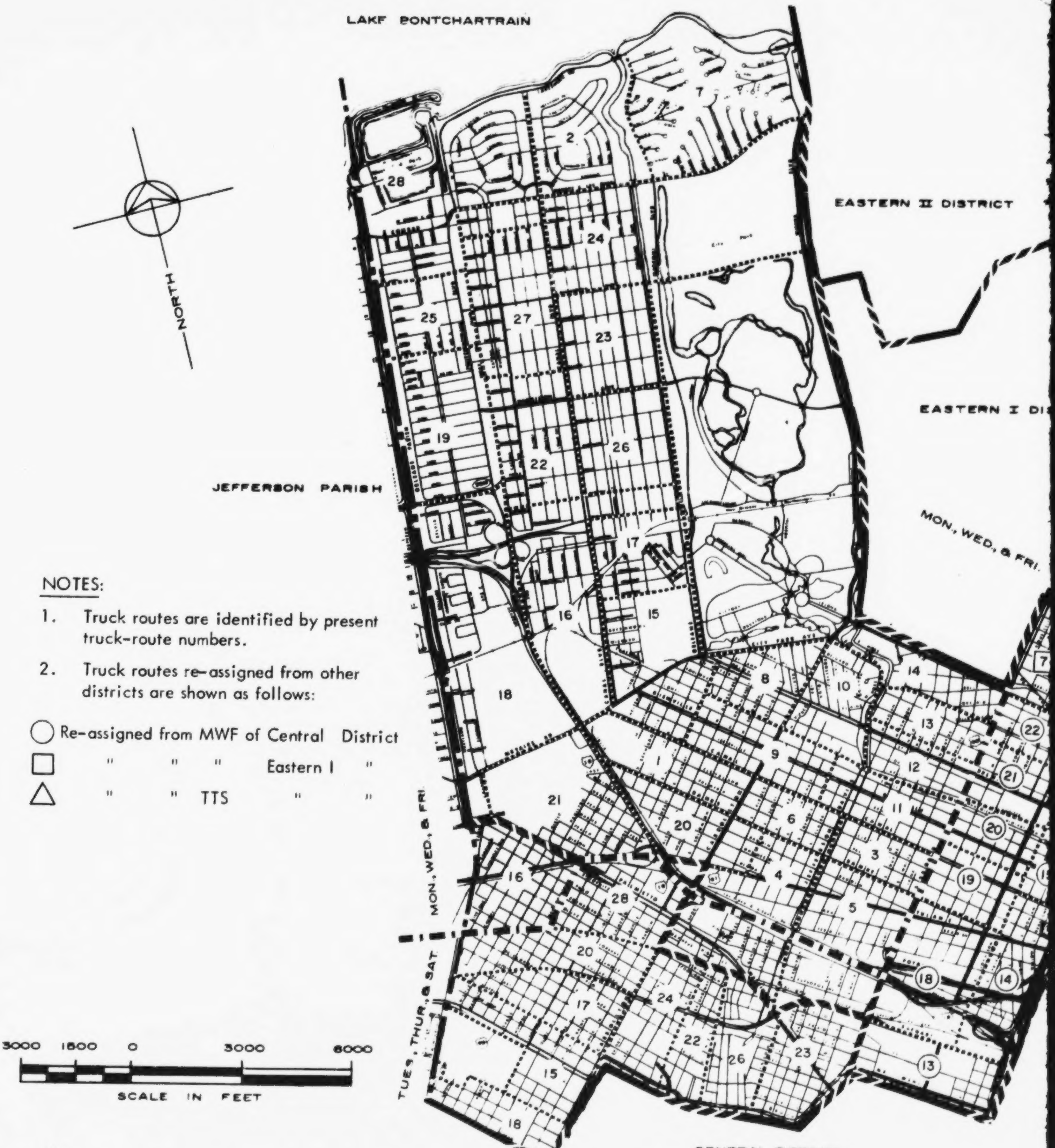

NORTH
TUES, THUR, & SAT
MON, WED, & FRI
WESTERN DISTRICT
NIGHT DISTRICT
REVISED CENTRAL DISTRICT
LEGEND
7th STREET INCINERATOR
BOUNDARIES
COLLECTION DISTRICTS
REVISED COLLECTION DAY GROUP
PRESENT COLLECTION DAY GROUP
TRUCK ROUTES
1
2
3
4
5
6
7
8
9
10
11
12
13
14
19
21
25
27
15
16
17
18
20
22

NOTES: 1. Truck routes are identified by present truck-route numbers.

2. Truck-route numbers shown inside a circle indicate Tues – Thurs – Sat routes re-assigned from Western District

FIG. V-9

B


LAKE PONTCHARTRAIN
EASTERN II DISTRICT
EASTERN I DI
MON, WED, & FRI.
JEFFERSON PARISH
NORTH
TUES, THUR, & SAT
MON, WED, & FRI
CENTRAL DISTRICT
3000
1500
0
3000
6000
SCALE IN FEET

NOTES:

1. Truck routes are identified by present truck-route numbers.
2. Truck routes re-assigned from other districts are shown as follows:

○ Re-assigned from MWF of Central District

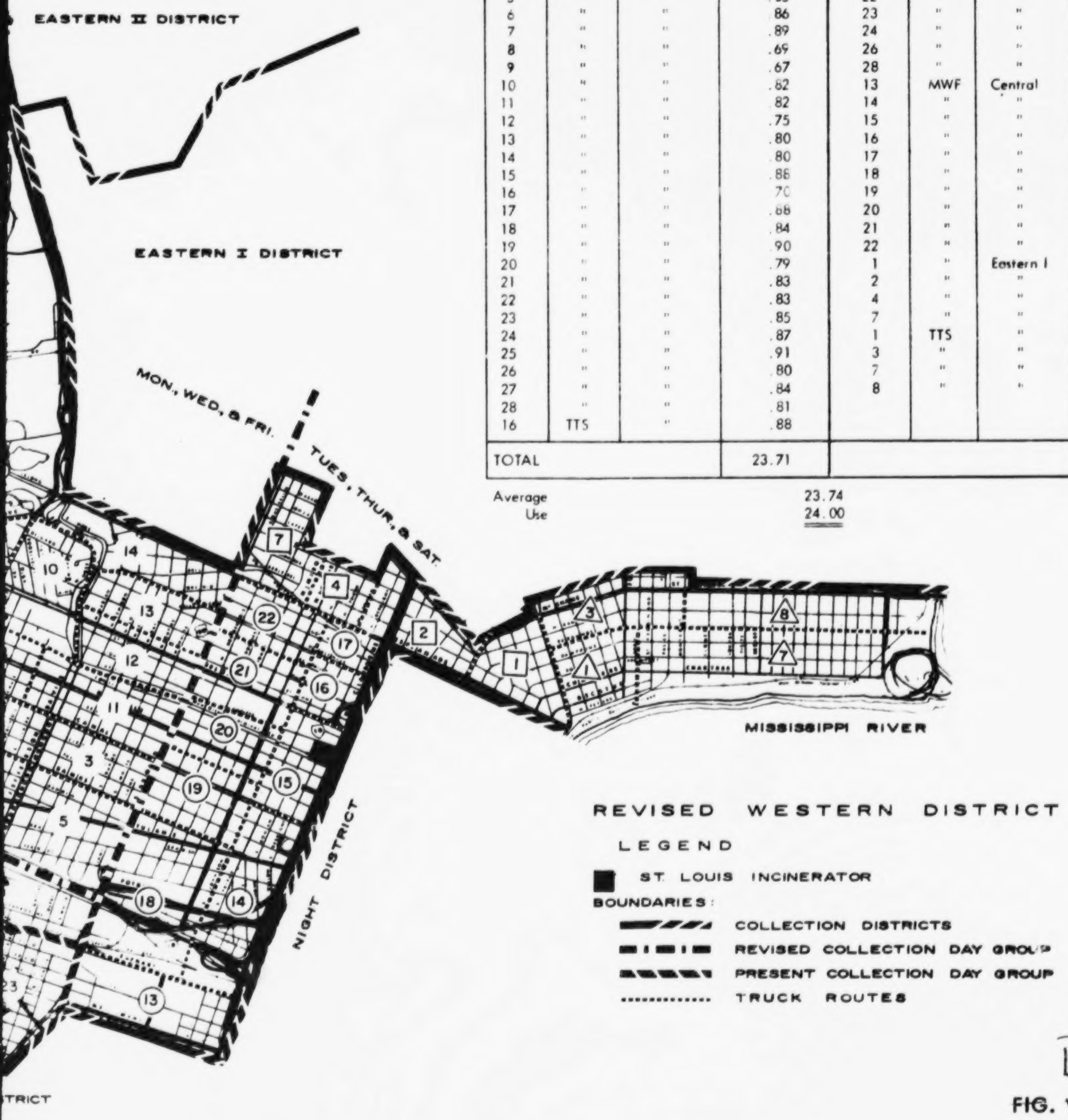
□ " " " Eastern I "

△ " " TTS " "

A

MON - WED - FRI COLLECTION				TUES - THURS - SAT COLLECTION			
Present Operation			No. Trucks Req'd.	Present Operation			No. Trucks Req'd.
Route No.	Day	District		Route No.	Day	District	
1	MWF	Western	.83	15	TTS	Western	.93
2	"	"	.84	17	"	"	1.00
3	"	"	.72	18	"	"	.91
4	"	"	.76	20	"	"	.92
5	"	"	.85	22	"	"	.81
6	"	"	.86	23	"	"	.87
7	"	"	.89	24	"	"	.91
8	"	"	.69	26	"	"	.91
9	"	"	.67	28	"	"	.90
10	"	"	.82	13	MWF	Central	1.00
11	"	"	.82	14	"	"	.85
12	"	"	.75	15	"	"	.83
13	"	"	.80	16	"	"	.78
14	"	"	.80	17	"	"	.80
15	"	"	.88	18	"	"	.87
16	"	"	.70	19	"	"	.78
17	"	"	.88	20	"	"	.69
18	"	"	.84	21	"	"	.94
19	"	"	.90	22	"	"	.80
20	"	"	.79	1	"	Eastern I	.75
21	"	"	.83	2	"	"	.87
22	"	"	.83	4	"	"	.74
23	"	"	.85	7	"	"	1.03
24	"	"	.87	1	TTS	"	.98
25	"	"	.91	3	"	"	.96
26	"	"	.80	7	"	"	1.00
27	"	"	.84	8	"	"	.93
28	"	"	.81				
16	TTS	"	.88				
TOTAL			23.71				23.76

Average 23.74
Use 24.00


EASTERN II DISTRICT
EASTERN I DISTRICT
MON, WED, & FRI.
TUES, THUR, & SAT.
NIGHT DISTRICT
MISSISSIPPI RIVER
TRICT
10
14
13
12
11
3
5
23
13
7
4
22
17
2
21
16
20
15
19
18
14
1
3
1
8
7
LEGEND
ST. LOUIS INCINERATOR
BOUNDARIES:
COLLECTION DISTRICTS
REVISED COLLECTION DAY GROUP
PRESENT COLLECTION DAY GROUP
TRUCK ROUTES

REVISED WESTERN DISTRICT

B

FIG. V-10

MON - WED - FRI COLLECTION				TUES - THURS - SAT COLLECTION			
Present Operation				Present Operation			
Route No.	Day	District	No. Trucks Req'd.	Route No.	Day	District	No. Trucks Req'd.
3	MWF	Eastern I	.86	2	TTS	Eastern I	.92
5	"	"	.81	4	"	"	.93
6	"	"	.82	5	"	"	.92
8	"	"	.70	6	"	"	.86
9	"	"	.77	9	"	"	.91
10	"	"	.98	10	"	"	1.00
11	"	"	.81	11	"	"	.92
12	"	"	.77	12	"	"	.90
13	"	"	.72	13	"	"	.97
14	"	"	.91	14	"	"	.89
15	"	"	1.00	15	"	"	1.01
16	"	"	.74	16	"	"	.91
17	"	"	1.00	17	"	"	.90
18	"	"	.96	18	"	"	.99
19	"	"	.81	19	"	"	.96
20	"	"	.84	20	"	"	1.00
21	"	"	.85	21	"	"	.90
22	"	"	.75	22	"	"	.88
8	"	Eastern II	.90	7	"	Eastern II	.92
9	"	"	.65	8	"	"	.81
10	"	"	1.01	9	"	"	.82
11	"	"	.66	10	"	"	.86
12	"	"	.89				
12	"	"	1.00				
TOTAL			20.21				20.18

Average	20.19
Use	20.00

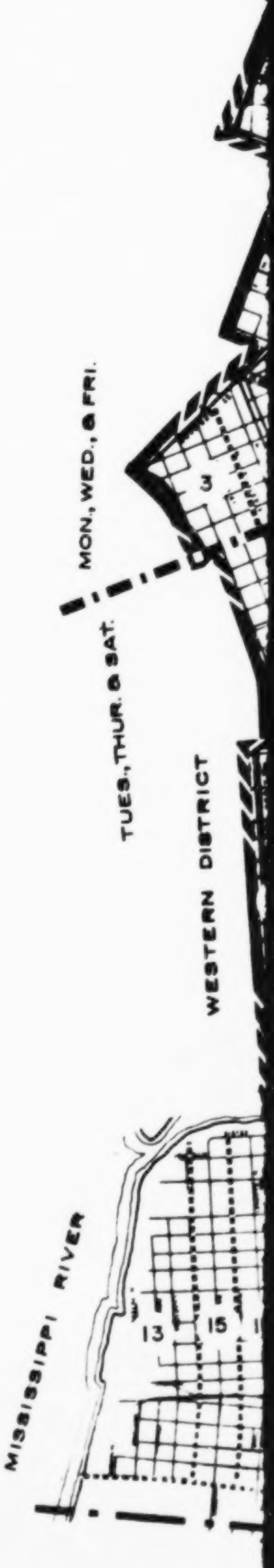
NOTES: 1. Truck routes are identified by present truck-route numbers.

2. Truck routes re-assigned from other districts are shown as follows:

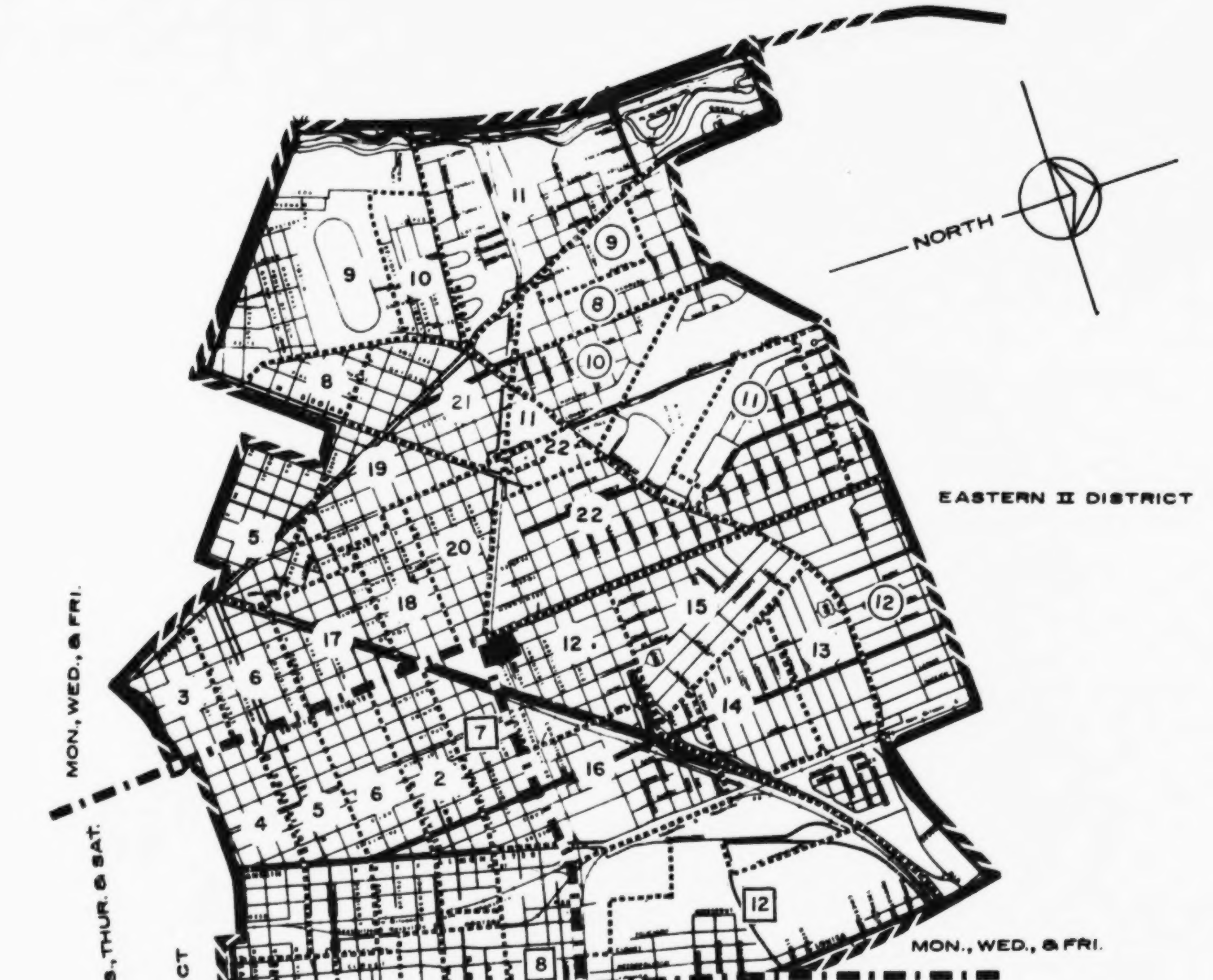
○ Re-assigned from MWF of Eastern II District

□ " " TTS " "

A



ON
No. Trucks Req'd.
.92
.93
.92
.86
.91
1.00
.92
.90
.97
.89
1.01
.91
.90
.99
.96
1.00
.90
.88
.92
.81
.82
.86
20.18


NORTH
EASTERN II DISTRICT
MON., WED., & FRI.
TUES., THUR. & SAT.
WESTERN DISTRICT
MISSISSIPPI RIVER
MON., WED., & FRI.
TUES., THUR. & SAT.
HARBOR NAVIGATION
REVISED EASTERN I DISTRICT
LEGEND
FLORIDA AVENUE INCINERATOR
BOUNDARIES:
COLLECTION DISTRICTS
REVISED & PRESENT COLLECTION DAY GROUP
TRUCK ROUTES
3000 1500 0 3000 6000
SCALE IN FEET
9
10
11
9
8
10
8
21
11
11
22
19
22
5
20
18
15
12
17
12
13
6
3
14
7
2
16
6
5
4
12
8
9
9
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22
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10
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12
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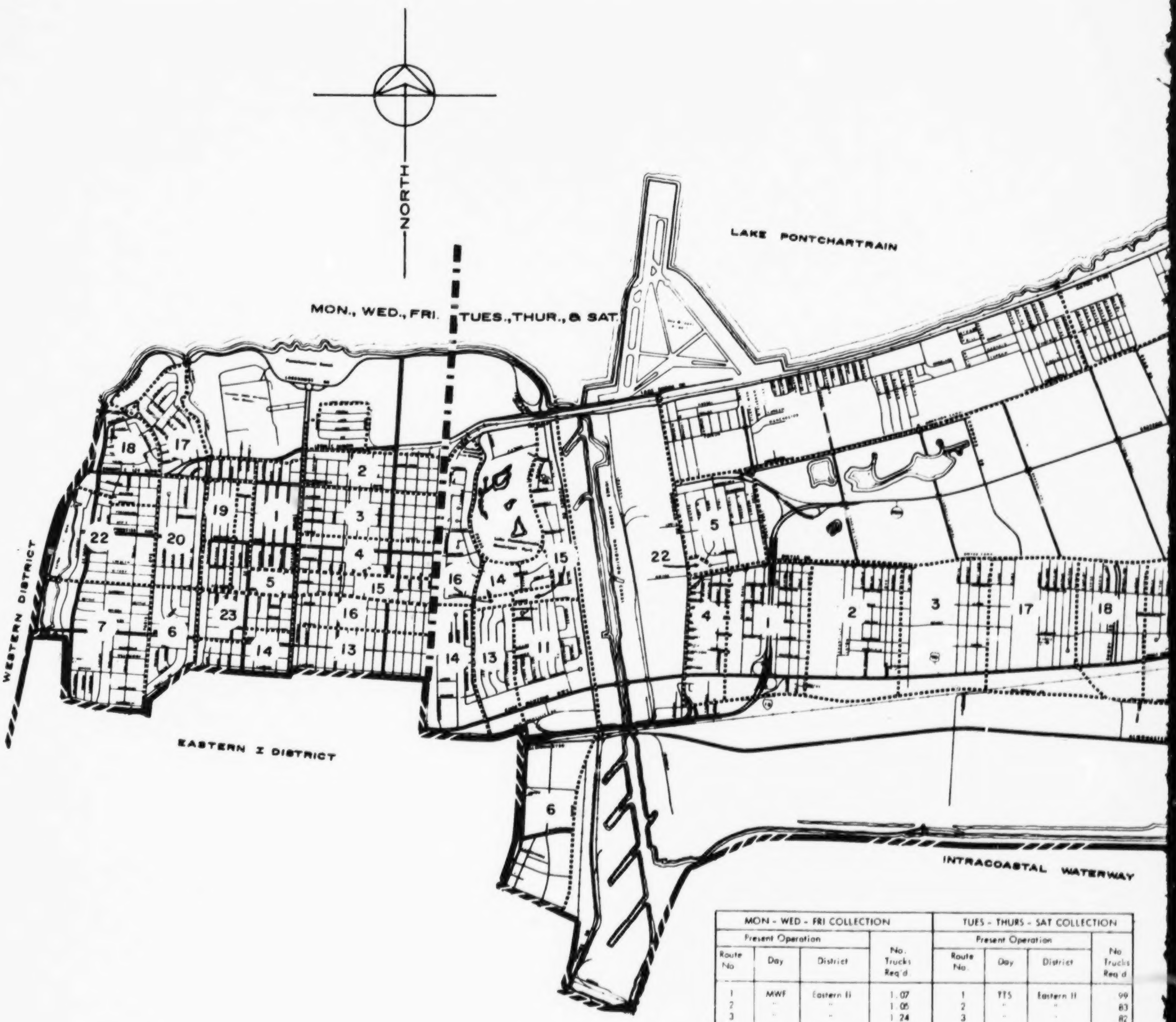
19
20

FIG. V-11

B

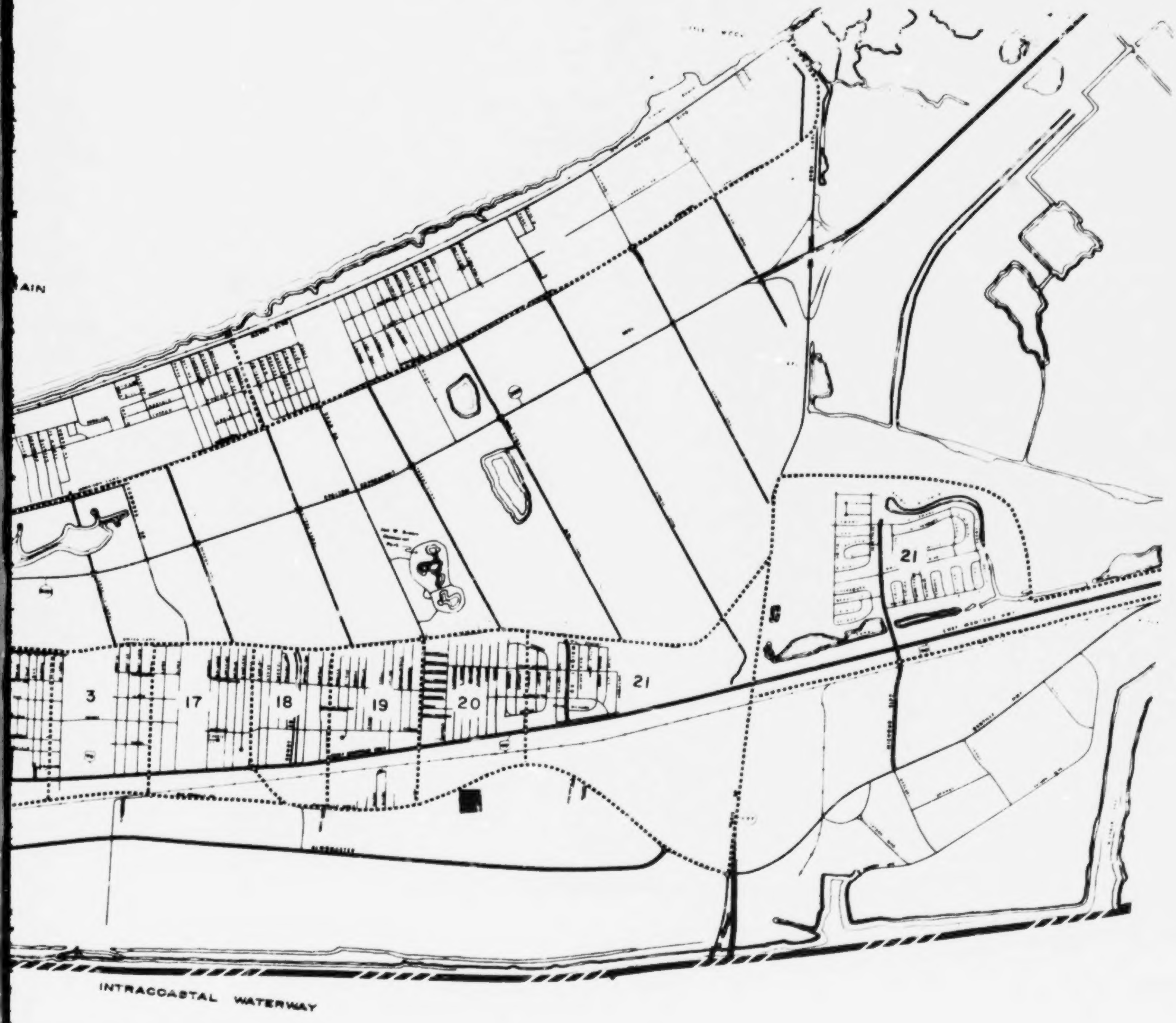

NORTH
LAKE PONTCHARTRAIN
MON., WED., FRI.
TUES., THUR., & SAT.
WESTERN DISTRICT
EASTERN I DISTRICT
INTRACOASTAL WATERWAY
1
2
3
4
5
6
7
13
14
15
16
17
18
19
20
22
23
3000 1500 0 3000 6000
SCALE IN FEET

NOTE: Truck routes are identified by present truck-route numbers.

MON - WED - FRI COLLECTION				TUES - THURS - SAT COLLECTION			
Present Operation			No. Trucks Req'd	Present Operation			No Trucks Req'd
Route No	Day	District		Route No.	Day	District	
1	MWF	Eastern II	1.07	1	TTS	Eastern II	99
2	"	"	1.05	2	"	"	83
3	"	"	1.24	3	"	"	82
4	"	"	93	4	"	"	84
5	"	"	.96	5	"	"	94
6	"	"	1.10	6	"	"	95
7	"	"	1.07	11	"	"	1.08
13	"	"	.82	13	"	"	1.06
14	"	"	.77	14	"	"	98
15	"	"	.85	15	"	"	92
16	"	"	.87	16	"	"	86
17	"	"	93	17	"	"	84
18	"	"	1.35	18	"	"	78
19	"	"	90	19	"	"	80
20	"	"	99	20	"	"	70
22	"	"	1.01	21	"	"	73
23	"	"	1.22	22	"	"	85
				23	"	"	85
				21	MWF	Eastern II	86
TOTAL			17.13				16.68

Average 16.90
Use 17.00

A



TION	TUES - THURS - SAT COLLECTION			
	Present Operation			
No. Trucks Req'd	Route No.	Day	District	No. Trucks Req'd
1.07	1	TT	Eastern II	99
1.05	2	"	"	83
1.24	3		"	82
93	4	"		84
96	5			74
1.10	6			95
1.07	11			1.08
82	13	"	"	1.06
77	14	"	"	98
85	15	"		92
87	16	"		86
93	17	"		84
1.35	18		"	76
90	19			80
99	20			71
1.01	21			73
1.22	22	"		85
	23			85
	21	MWF	Eastern II	86
17.13				16.68

16.90
17.00

REVISED EASTERN II DISTRICT

LEGEND

■ N. O. EAST INCINERATOR

BOUNDARIES:

▬ ▰ ▰ ▰ COLLECTION DISTRICTS

▬ ▮ ▬ ▮ REVISED & PRESENT COLLECTION DAY GROUP

.... TRUCK ROUTES

FIG. V-12

B

4. Savings in Haul Costs

In order to arrive at the dollar savings that would result from the adjusted refuse collection system, cost data obtained from the Sanitation Department were reduced to cost per truck per year.

The cost figures include payroll, operating and maintenance expenses, fringe benefits, and other miscellaneous expenditures covering the cost of operating the vehicles. As would be expected, with generally rising prices the cost is increasing yearly as shown by Table V-37 which covers expenditures of the last three years.

TABLE V-37

ANNUAL COST OF COLLECTION TRUCKS
(Cost Per Truck)

		1965	1966	1967
1.	No. of Trucks Route	125	125	111
2.	Payroll (Incl. Social & Fringe Benefits	$12,806	$14,474	$17,226
3.	Insurance & Licenses	220	220	250
4.	Operating & Maintenance	3,300	3,640	4,270
5.	Capital Cost (Estimated)	1,250	1,250	1,250
	Total Cost (Trucks/Year)	$17,576	$19,584	$22,996

A savings of ten trucks will, therefore, amount to approximately $230,000 per year, based on 1967 prices. This figure compares favorably with the annual savings of $231,000 in haul cost previously described which savings was based strictly on the reduction in haul time.

5. Future Collection Districts for First Stage Development

As previously mentioned, we were able to verify in the process of the haul study, the excellent location of the present incinerators with respect to their service areas. The revised collection layout to be implemented as soon as the incinerator at St. Louis is put in service, was based on the present capacities of the various incinerators and their ability to handle the refuse produced in their tributary areas.

By increasing the capacities of the Florida Avenue and the Seventh Street incinerators, it would be possible to further improve the collection system to meet the future requirements of the City. Whereas the revised collection districts to be served by the present incinerators were limited by the capacities of these units, it is obvious that the larger plants at Florida Avenue and Seventh Street provide more flexibility in adjusting the boundaries of the service areas. These incinerators are located within relatively short distances from the source of most intense refuse production so that their service areas may be increased in relation to the larger incinerator capacities, and thus achieve additional savings in the cost of refuse collection and disposal.

Following the above criteria, we have further revised the collection districts served by the two incinerators. These are shown in Figure V-13 (backcover) where it may be noted that the Eastern I and Central Districts have been enlarged considerably by taking in areas from the adjacent Eastern II and Western Districts. The Night and Algiers District will remain within their present boundaries. In order to properly evaluate the effectiveness of the proposed system, it was necessary that we project the population growth of the revised districts and estimate the quantities of refuse production in each.

Based on the result of the haul study, we were able to estimate the savings that would result by implementing the changes recommended herein at approximately $50,000 per year in haul cost (1967 prices) when both of these incinerators are enlarged and placed into operation (1973). The major savings will be obtained by assigning all of the Mon-Wed-Fri routes from Eastern II District to the Florida Avenue incinerator instead of New Orleans East. In addition, the new system will relieve the load from the St. Louis and New Orleans East incinerators which will be too small to serve their present service areas by 1975.

The distribution of the load among the incinerators under the proposed layout from 1975 to 1990 is shown in Table V-45 (page V-112). We estimate that the recommended districting will be adequate at least until 1980 when the entire system will have to be re-evaluated.

6. Future Requirements in Number of Trucks

We have previously established in Table V-33 (page V-61) the projected amount of refuse, by districts, to be collected by the City forces in future years. Based on these estimates and on the average tonnage picked up by the vehicles per day in each district so as to maintain the work load of the crews about the same as presently, we calculated the number of truck routes that will be required in the future.

The result of our calculations are presented graphically in Figures V-14 V-15 and V-16 covering a period from the present to 1985. A summary of the estimated number of truck routes required by districts in a five-year interval is shown in Table V-38.

TABLE V-38

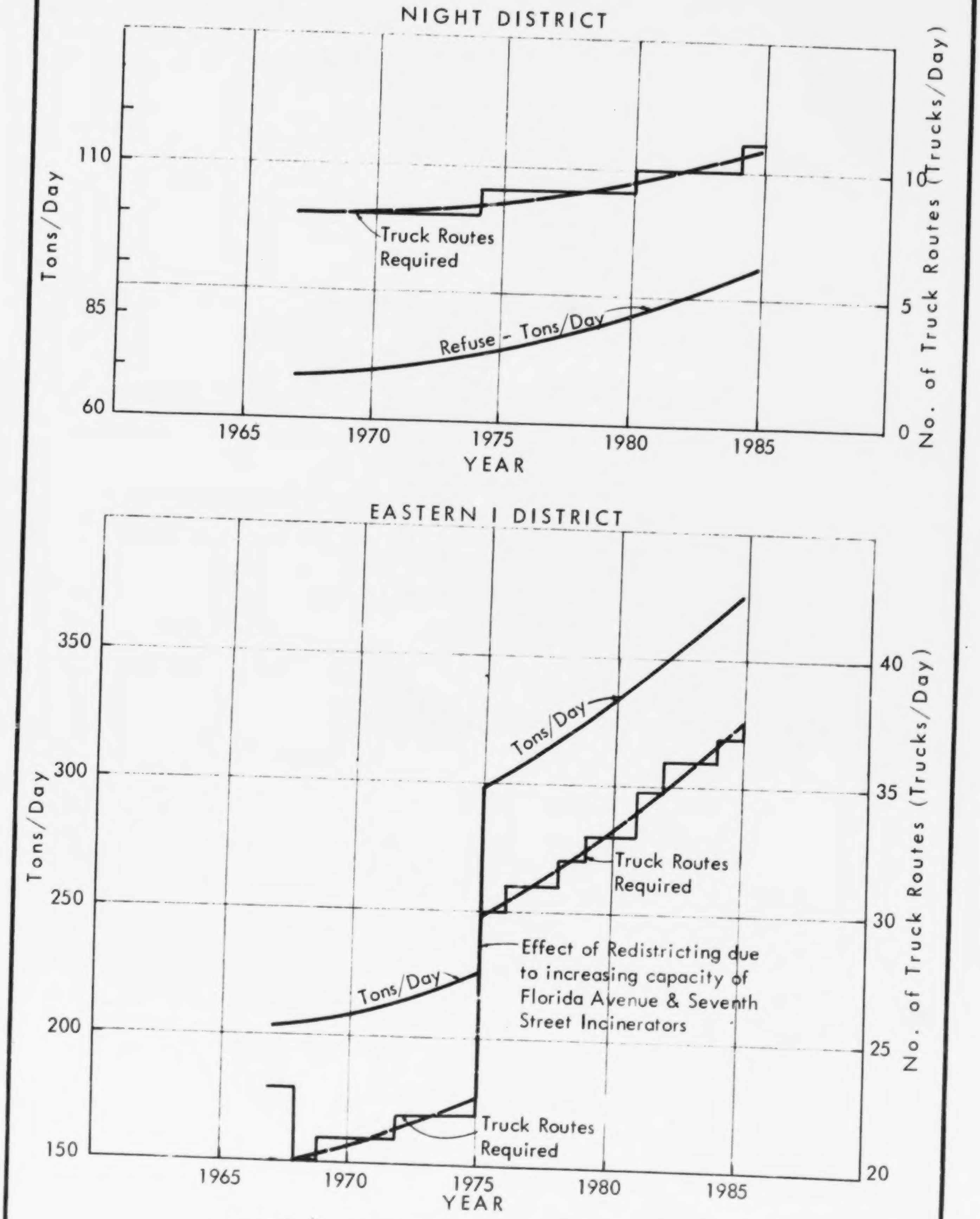
ESTIMATE OF FUTURE REQUIREMENT-TRUCK ROUTES PER DAY

	District	1968	1969	1970	1975*	1980	1985
1.	Central	24	24	25	31	33	36
2.	Western	24	25	25	20	22	24
3.	Eastern I	20	21	21	30	33	37
4.	Eastern II	17	19	20	19	26	34
5.	Algiers	8	9	9	12	15	18
6.	Night	8	8	8	9	10	11
	Total	101	106	108	121	139	160

*From 1975 on, based on districts for First Stage Development with Florida Avenue and Seventh Street Incinerators enlarged and in service. (Refer to Map V-14, backcover).

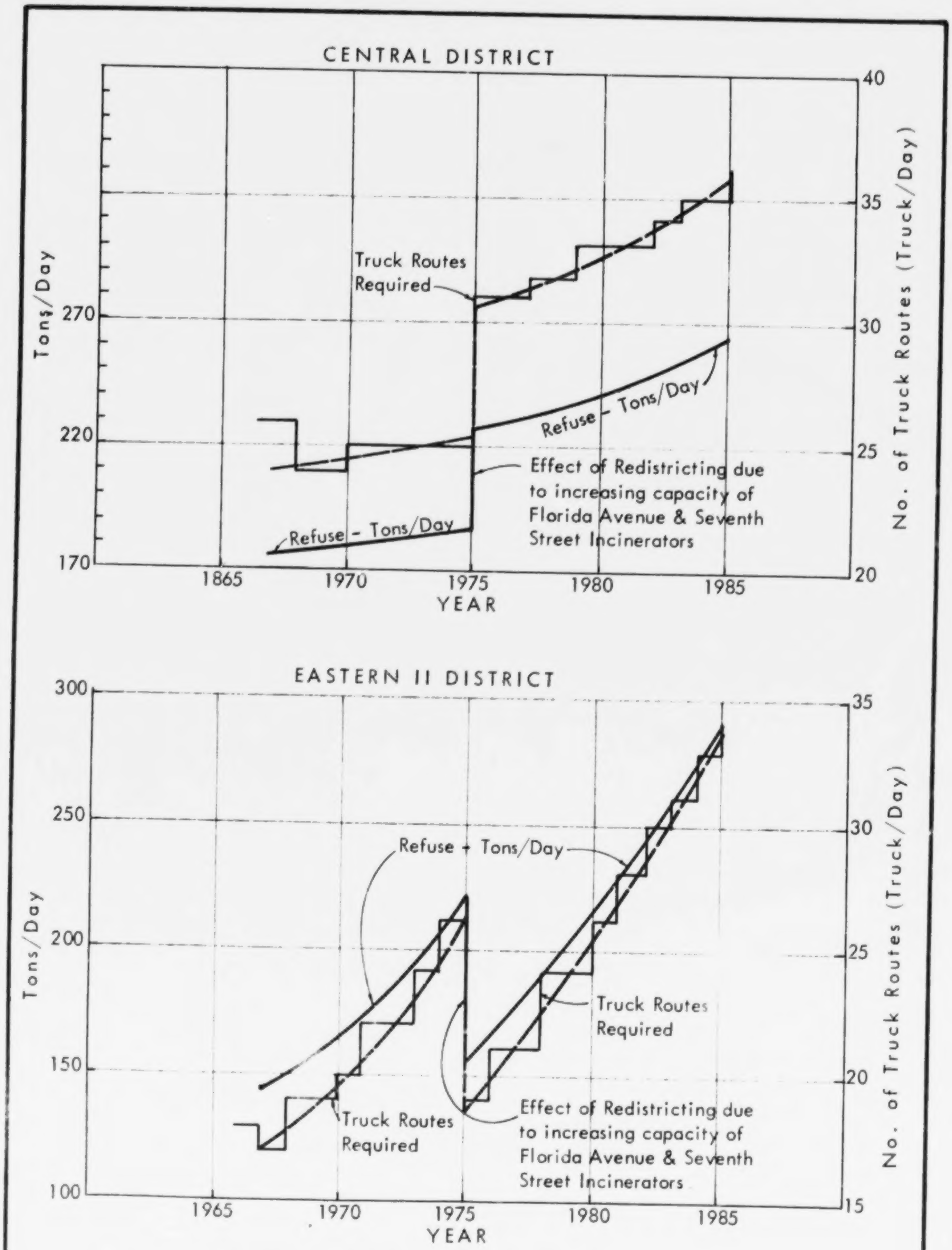
The rapid increase in the number of truck routes in the Algiers and Eastern II Districts is reflected by the greater rate of growth anticipated by the City Planning Department for these areas.

The above figures are estimates based on the best information available. The actual number of routes required in the future will vary according to operating conditions then existing which will require a re-evaluation of the system every few years. Also, some of the districts may be reduced in size once it becomes apparent that they are too large to function effectively.



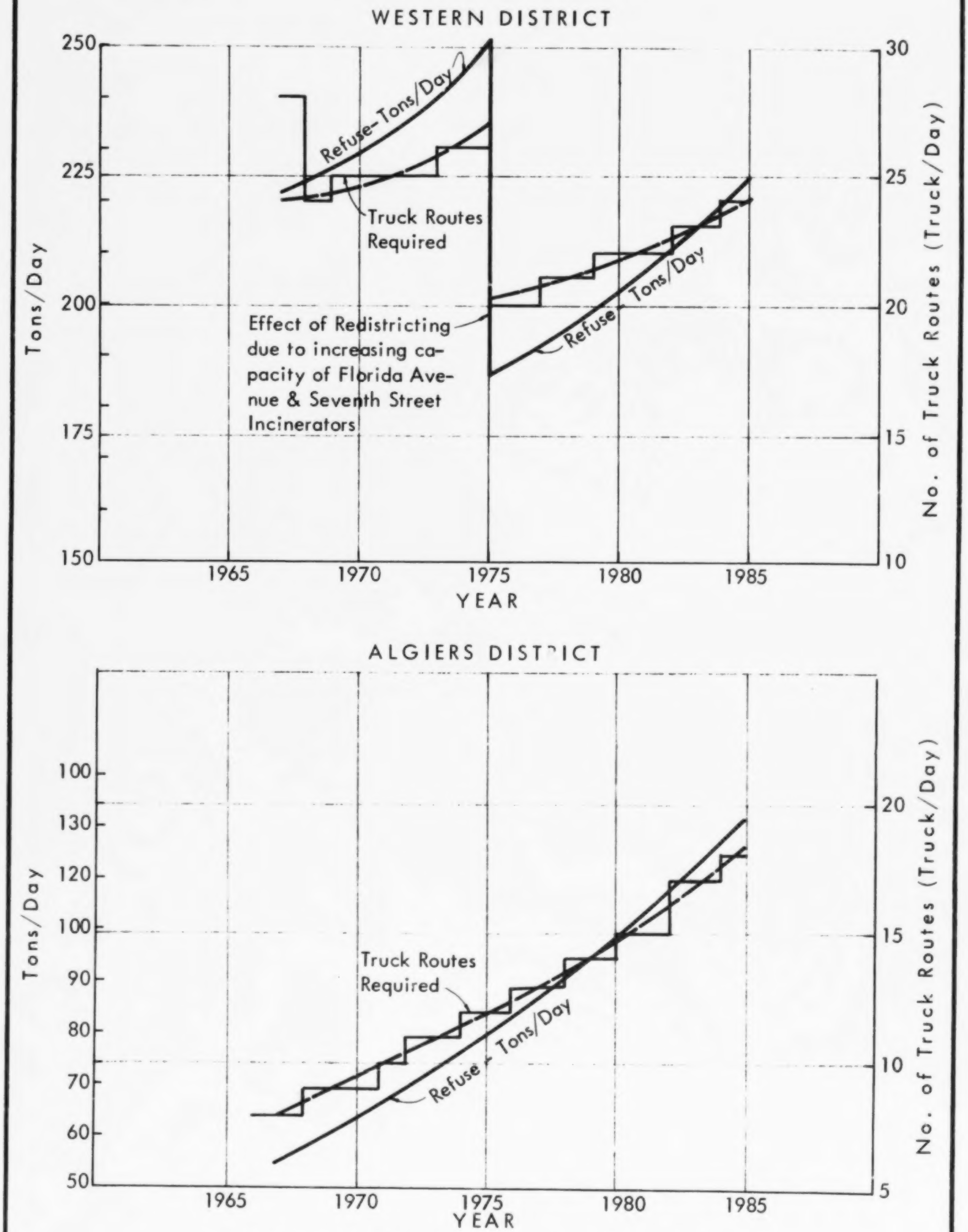
FUTURE NUMBER OF TRUCK ROUTES
NIGHT AND EASTERN I DISTRICTS

FIG. V-14



FUTURE NUMBER OF TRUCK ROUTES
CENTRAL AND EASTERN II DISTRICTS

FIG. V-15



FUTURE NUMBER OF TRUCK ROUTES
WESTERN AND ALGIERS DISTRICTS

FIG. V-16

7 Collection Service to Fringe Areas

The greatest area of future development within the city limits is expected in the Eastern II collection district where the City is rapidly extending into the presently undeveloped lands along the southern shore of Lake Pontchartrain. At present, development in the Chef Menteur-Rigolets area is largely limited to fishing camps, which for the most part are occupied on a seasonal basis. The Sanitation Department has estimated that about 1500 of these camps exist in this area for which no refuse collection service is presently provided even though they are located within the city limits. For the most part these camps are along the highways and border the lake, canals, or bayous. These properties pay city taxes and are entitled to city services, including the collection of refuse, however, there has been no strong demand on the part of the owners for such services due to the periodic and temporary nature of occupancy of these camps and to the convenience of disposing of their refuse on their property or in the nearest waterway. It would appear that until such time as refuse disposal becomes a problem to the residents of the area and a concerted demand for service is made, that there should be no special effort to provide such service. When collection service is initiated based on the demand of the residents, it should be limited only to such residents who meet the requirements, as to placing standard containers alongside of the road for easy access to the collection vehicles. It is our opinion that initially one collection vehicle and crew should adequately meet the requirements of the area on a one or two collections per week frequency, with additional vehicles and crews provided as the area develops.

A second district of anticipated growth is the lower coast Algiers area. When the demand for collection service is made in this area one of the present truck routes can be extended to provide the necessary service initially, and be later served by a route specifically assigned to that area.

8. Summary of Analysis of Collection System

In this section we have analyzed the refuse collection system with particular emphasis on the time required to haul refuse from each collection district to the present point of disposal and have calculated the savings in haul time which would be affected by readjusting the districts to take full advantage of the use of the five incinerators. These studies have shown that the savings in haul time required to transport refuse from the collection district to the disposal area would possibly permit reducing the number of collection vehicles by ten as shown in Table V-25. It must be pointed out that these studies are based on field surveys carried out in November and December of 1967 and reflect conditions prevailing at that time.

In Table V-38 we have shown the increase in number of truck routes required in each of the collection districts between the present and 1985. This increase is based on the anticipated growth of the New Orleans area as determined by the City Planning Department. It will be noted that the 101 truck routes required based on our calculations for conditions prevailing at the end of 1967 will increase to 106 by 1969. Since it is expected that the St. Louis Incinerator should be placed in service prior to implementing the modifications of the collection districts as recommended herein, should this plant not be placed in operation until 1969 as now appears likely, then a total of 106 truck routes will be required (1969) amounting to a savings of five routes from the present 111.

The reduction in the number of truck routes as outlined herein should be implemented based on careful field verification by the Superintendent of the Sanitation Department in close cooperation with his District Supervisors and Section Foremen of the areas involved. Since these changes are affected by various factors, such as tonnage collected, distance, time, size and characteristics of the areas, as well as crew characteristics, it is recommended that the reduction in truck routes be accomplished gradually and by collection districts.

D. Discussion of Existing Disposal Facilities

1. General

The City at present has five incinerators and two landfill operations which together with a landfill operated by the New Orleans Disposal Company receive most of the waste generated within its limits. The location of each of these facilities is shown on Figure I-1 (backcover).

At present the Florida Avenue, Seventh Street, and Algiers incinerators are in regular operation on a six-day, 24-hour schedule. The St. Louis incinerator, which was rebuilt in 1966, has not yet been placed in regular operation pending the correction of operational difficulties. The New Orleans East Incinerator has just been completed and its performance is being tested prior to placing it in operation. Each of these incinerators is well located with respect to the area served and will provide for the disposal of the solid waste generated within the City within a reasonable haul distance.

Since two of the five incinerators are not now operating, the landfills are receiving considerable quantities of municipal waste as well as a large part of the commercial and industrial waste from the area. The Gentilly landfill is the largest and is located close to the New Orleans East incinerator. Fill is being placed to a compacted depth of about six feet. Burning is not practiced at this location nor is there a regular program for placing cover material. The Algiers landfill is located on the Westbank near the City Limits in an undeveloped area and here open burning is practiced as a means of reducing the volume of the refuse.

2. Evaluation of Present Landfills

All three of the landfills being operated in Orleans Parish are on low ground either covered with water or subject to frequent flooding where leachates from the landfills can cause contamination of the streams and bayous with the possible hazards to the ecology of the waters as discussed in Chapter IV.

While efforts are made to control burning at the Gentilly dump, fires are not uncommon and large areas of refuse are uncovered for extended periods. Burning is regularly practiced at both the Algiers Dump and at the one operated by the New Orleans Disposal Company.

Little cover material is provided at any of the dumps other than may be needed to provide access to the dumping area. All three of these landfill operations must be considered as unsanitary contributing to both air and water pollution and to the breeding of insects and vermin with the always present hazard of spread of disease to the citizens of the area as history has previously demonstrated.

Until such time as adequate incinerator capacity is available, open dumps should be converted to sanitary landfills within properly diked and drained areas with proper and adequate cover material provided as discussed in Chapter IV. Since both the Gentilly and Algiers landfills are on leased property, it would be necessary for the City to acquire a suitable site in order to invest the capital required to construct the dikes and other improvements needed before filling could be undertaken. After filling, the area could be used for park purposes.

3. Evaluation of Present Incinerators

As a part of our study we engaged the services of Abraham Michaels, P. E., Incinerator Consultant, to inspect and evaluate each of the following existing incinerators:

Seventh Street Incinerator - constructed in 1959 at a cost of $1,112,960.67 - nominally rated at 400 tons per day.

Florida Avenue Incinerator - constructed in 1957 at a cost of $727,979.14 - nominally rated at 400 tons per day.

Algiers Incinerator - constructed in 1962 at a cost of $933,214.28 - nominally rated at 200 tons per day.

St. Louis Street Incinerator - completely renovated during 1966 and 1967 at a cost of $1,097,813.49 - nominally rated at 450 tons per day - not yet accepted by the City.

New Orleans East Incinerator - constructed in 1967 at a cost of $2,353,387.23 - start-up and tests scheduled for early 1968 - nominally rated at 400 tons per day.

The report covering this work, including general comments on factors affecting the design and operation of incinerators, has been incorporated in its entirety in the following text:

A detailed description, review of operations, and evaluation of each plant is included in this report. However, a brief statement describing the character of refuse, the design criteria for incinerators, and the recent changes of both is offered to assist in understanding the evaluation of the various incinerators.

On a nationwide basis, the quantity and character of refuse continues to change due to changes in production, packaging, and distribution of consumer goods and the growing affluence and wastefulness of our society. In 1966, the National Academy of Sciences - National Research Council reported ". . . the average per capita refuse production - those solid wastes ordinarily subject to routine collection - increased from 2.75 lbs. per day in 1920 to 4.5 lbs. per day in 1965. At present, the per capita rate of refuse production is increasing at a rate of 2 per cent a year. . ."

The character of refuse in New Orleans is somewhat different from "average" refuse in the United States because of weather conditions. The warm, humid weather with above average rainfall, approximately 63" per year compared with a national average between 35" and 40" per year, generates a refuse with more fresh food wastes, grass clippings and shrub and tree trimmings, than the average. However, the increased quantity of paper and plastics from packaging changes is also affecting New Orleans refuse, and today's refuse is probably less moist and contains a higher heat value than New Orleans refuse of the past several decades.

Moisture content and heat value are important factors affecting the designs of new incinerators and the capacities of existing plants. As these factors vary, the need for axuiliary fuel and the grate size and combustion space requirements vary. Plants designed for the heat value of refuse several years ago may not be capable of incinerating the original design quantities of today's refuse. This factor must be recognized when evaluating existing facilities.

Other criteria used to evaluate incinerator plants are the quality of discharges from the plant, which include furnace residue, gaseous emissions, and waste water, plant maintenance experience, and plant appearance including odors and nuisance attraction.

Several of the New Orleans incinerator contract specifications indicated that the furnaces were to be constructed to accommodate refuse with a high heat value of 5,000 BTU's per pound and, at the other extreme, a refuse with so much moisture that there would not be sufficient heat available to evaporate all the moisture. This is generally refuse with heat value under 3,000 BTU's per pound. In all instances, gas burners were provided to supply the heat required to evaporate the excess moisture. The two extreme conditions noted appear reasonable for today's New Orleans refuse, and, although these values may not have been used for all plants, it is reasonable to use them for the present evaluation.

4. Operations Review and Evaluation

The standard incinerator operating schedule for New Orleans consists of a four-shift day, six-day work week with ten legal holidays per year. This results in a 303-day work year on a regular pay basis. Operations are also continued on an overtime pay basis on all holidays with the exception of Christmas. Incinerator shifts operate on a 12-6-12-6 schedule, and employees work a 6-hour-40 minute work day, six days per week. Twenty minutes is allowed at the start and end of each shift for washing and change of clothing. The plants start operation at 6:00 a.m. on Monday mornings. The first two or three hours are spent cleaning, lubricating, and maintaining equipment, furnaces, cranes, etc. Burning actually starts around 8:00 a.m. or shortly thereafter. The schedulle is well conceived since it provides a 40-hour work week and coincides with the six-day refuse collection operation.

It is common practice in New Orleans to permit refuse storage pits to hold refuse for abnormally long periods of time. Plant operators report that the pits are seldom cleaned even once a year. As a result, refuse tends to decompose while in the pit, which generally creates odor and other nuisance problems. Although there was no evidence of serious odor problems at the time of inspection, the pits contained many flies and birds. Another undesirable feature of this method of operation is that it reduces the amount of space available in the storage pit for normal daily operations. Consequently, if a breakdown occurs in the plant, thereby reducing or eliminating furnace capacity, or if unusually high collection quantities or collection vehicle breakdowns result in above normal deliveries to the plant, the pit storage space, being reduced by the held-over refuse is less likely to be adequate for the extra load. This practice also requires additional stockpiling or re-casting of refuse to provide dumping space for incoming refuse and increases the unloading time for collection vehicles. Since water level storage capacities of all the pits average better than a full day's operating capacity, the smallest being approximately one day's capacity, it is recommended that storage pit operations be changed to provide for pit cleanouts at least once every two weeks. This can easily be accomplished by scheduling deliveries to plants and landfills each day based upon the quantities of refuse stored in the pits.

The residue coming from the three plants in operation at the time of the inspection was all of poor quality and would not be considered acceptable for disposal without daily cover with clean earth. Large amounts of unburned paper, food waste, and other materials were observed. This condition will be analyzed in the detailed evaluation of each plant. It is noted that the residue quality from the renovated St. Louis incinerator was reported as excellent by the City operator.

Plant operators complained about the lack of availability of incinerator residue vehicles and the problems encountered with this equipment. This is a common problem with municipalities and generally occurs when the incinerator residue truck is considered as one which is subject to the same type of service as other sanitation vehicles. Sanitation service is more severe than most any other service on vehicles because of the nature of the sanitation operation and the type of materials handled. The service of incinerator residue vehicles is the most severe service of any sanitation vehicles because, as is true in New Orleans, the vehicles are used 24 hours per day and they carry material which is extremely abrasive and often corrosive. The truck loading area at the incinerator is usually one with severe dust and moisture problems seriously affecting the combustion air supply to the motor and the residue truck body. This service is further affected by the fact that these vehicles operate at landfill dumps at all hours of the day or night, which subjects them to poor riding conditions, often without adequate light. Incinerator operating costs are generally substantial and when plants are unable to operate as a result of lack of residue vehicles, the lost time in operation reflects in even higher operating costs. For these reasons, it is essential that properly designed trucks be used, that ample stand-by trucks be made available, i.e., a good stand-by number would be 100% of the operating number, and that these vehicles be replaced as often as once every two years.

Since the City of New Orleans does not have air pollution limits for incinerators, there haven't been any stack emission tests performed. Therefore, the air pollution evaluation will be based upon the efficiency of various types of incinerator control equipment as described in a recent U. S. Public Health Study prepared for the District of Columbia, and contained in a report entitled "Air Pollution Study of Municipal Incinerator Effluent Gases" dated February 1967. The equipment and efficiencies listed in the report are shown in Table V-39.

TABLE V-39

TYPES OF CONTROL EQUIPMENT

	Comparative Space	Efficiency	Basic Limitations
Electrostatic Precipitator	100%	90-99%	1. Does not remove soluble gases. 2. No installation working in U.S. municipal incinerators. 3. Efficiency low on large particles.
Scrubber (Flooded Plate)	33%	90-99%	1. Possible mist emitting from stack. 2. Clarification and neutralization of wash water required. 3. High water usage.
Mechanical Cyclone (60" Tangential)	33%	75-90%	1. Low efficiency on small particles. 2. Erosion from abrasive fly ash.
Baghouse Filter	110%	99%	1. Multitude of variables to be controlled coupled with the complexity of the effluent stream.
Settling Chamber	67%	40-60%	1. Low efficiency.

5. Seventh Street Incinerator

The Seventh Street Incinerator, constructed in 1959, is a two-furnace batch feed installation with combustion chambers, flues, and two 8'-0"x125' high chimneys, one for each furnace, to provide furnace draft and disperse the stack gases. Two four-ton, 2 1/2 cubic yard overhead traveling cranes are used to feed refuse from the storage bin to the furnaces. Only one crane is required to operate the plant which permits the second crane to be used as a standby. Each furnace contains four cells and four hydraulically actuated, manually controlled, rocker-arm burning grates and dump grates. Each furnace is provided with one 15,000 cfm forced draft fan to supply undergrate combustion air and with two gas burners with the capacity to supply 10,000,000 BTU/hour of heat to each furnace. Two wet troughs with drag flight conveyors are used for residue quenching and loading into open body residue trucks. The furnace discharge chutes are bifurcated to permit the residue to be deposited into either conveyor. This design permits the plant to be operated with one conveyor while the other is down for repairs or available as a standby unit. A wet spray system located in the breeching to the chimney is used for flyash control.

Plant records indicate that 99,730 tons, 98,185 tons, and 85,181 tons of refuse were processed in 1965, 1966 and 1967 respectively.

The refuse storage pit contains 1300 cubic yards of space at the tipping floor level, which is equivalent to 260 tons of refuse at 400#/cubic yard. This represents 15.7 hours of storage at the nominal plant capacity of 400 TPD or 22.2 hours at the 1967 incineration rate of 281 TPD. Considering plant downtime for breakdowns and repairs, the incineration rate at this plant is approximately 325 TPD. This storage space is sufficient to permit the pit to be cleaned out weekly.

The 2 1/2 cubic yard crane bucket will lift an average of 1500#/load. For a 400 TPD operation this represents a total of 534 loads/day or an average of one load every 2.7 minutes. For the 325 TPD actual capacity, the charging rate would be one load every 3.44 minutes. However, since the plant uses the batch feed system, all furnaces are charged in approximately the first third of each cycle, which represents a charging rate of one load every 1.1 minutes, if both furnaces are charged simultaneously. This is a reasonable rate for this type of plant.

A review of the operating records of this plant reveals that combustion chamber temperatures vary from lows of 600°F. to highs of 2000°F. when refuse is dry and highs of 1200°F. when refuse is wet. With the batch feed operation, the low temperature periods representing refuse charging, residue dumping, and furnace clean-out periods account for 20% to 40% of total operating time. With this record of operating experience, it can be concluded that the furnaces are operating at capacity only 70% of the time.

The grate size of the two furnaces is 290 sq.ft. each and combustion volume is 7,800 cu.ft. each. The grate size is adequate for the design rate of 200 tons/day of 5,000 BTU/lb. refuse, and the furnace volume is well in excess of the 6750 cu. ft. required. Combustion air for the 200 tons/day rate would be approximately 35,000 cu.ft. per minute of air for 150% excess air, a condition which is typical for batch feed plants. One 15,000 cfm forced draft fan is provided and additional air is needed to complete combustion. Some of this additional air, up to 40%, could be introduced over the grate, but the rest, approximately 6,000 cfm should be undergrate air. It appears that lack of undergrate air may account for some of the poor burn out experience at this plant.

Many batch feed plants operated without forced draft provided the natural stack draft is sufficient to draw undergrate combustion air through the bed of refuse. Although it might be desirable to attempt this in New Orleans, it is unlikely that this method would succeed because the spray chambers keep chimney temperatures low, thereby keeping natural draft low.

This plant also has a small crematory which originally was intended for the disposal of small dead animals, but currently is being used primarily for disposal of cadavers or amputated limbs. The crematory is equipped with a gas fired ignition burner and discharges into one of the incinerator stacks. There is no afterburner or temperature control on this furnace to insure complete combustion of the gases produced. However, although low temperature, unburned hydrocarbons may be emitted from the crematory, they represent a very small part of the total gaseous emission from the plant and they are well diluted with emissions from the incinerator furnace.

In addition to the gas used for the crematory, gas is used as a part of the regular incinerator burning cycle. The gas burners are used after the first bucket charges are placed in the furnace and are kept going until the furnace temperature reaches 1200°F. This may occur even before the furnaces are fully charged. After charging is completed, the forced draft fans are turned on and the batch of refuse is burned until temperatures drop indicating that the burning has been completed. Occasionally during this burning process, the rocker grates are activated and hand stoking is used to improve combustion.

The furnaces, flues, etc. were inspected while they were shut down on a Sunday. Some furnace grate beams were sagging, refractories were in need of repair in the furnace, and the furnace charge doors did not fit tight as they should. Refractories in the combustion chambers and flues were in reasonably good shape and the chimney appeared to be in good repair. Generally, the condition of the equipment, other than the cranes, appeared to be good. The temperature recording instruments were functioning well although they were not conveniently located for the use of plant operating personnel. At the time of the inspection, one crane was out of service and the other was operating at half speed. This is an indication of poor maintenance probably resulting from a lack of spare parts, some of which require long periods of time for delivery.

The following observations and recommendations are offered:

a. Poor residue quality is probably due to inadequate undergrate combustion air and improper furnace charging procedures. The inadequate combustion air quantity can be increased by installing a larger fan, say 25, 000 cfm @ 4" H_2O, or by increasing the natural draft and operating without the forced draft fan. Natural draft can be increased by reducing the water sprays. This would increase the particulate emissions from the stack, but part of this increase could be offset with the use of a stainless steel screen in the stack breeching and flyash traps in the flues. The furnace charging procedure should be changed by allowing more time between charges so as to permit a charge to reach a high temperature, say 1200°F., before placing another charge on top. This procedure would permit the initial charges to attain a better burnout. If this charging procedure is adopted, it is suggested that the use of the gas burners could be eliminated from the process, except when the refuse has a high moisture content.

b. From the standpoint of residue conveyor operations and crane charging operations, it would be desirable to operate the two furnaces independently and preferably on an alternate time schedule, i.e., completely charge one furnace before starting the second, and completely clean out the first furnace before cleaning out the second.

c. An effort should be made to reduce the dumping and clean out time of 20% to 40% of cycle time which is excessive. Recommendations a and b will help to accomplish this by producing a better burnout and reducing the quantity of residue to be removed from the furnace.

d. According to the Air Pollution Control Equipment table, settling chambers are capable of removing 40-60% of the flyash produced. Between 90% and 95% removal would be required to meet the federal standards. This plant is not capable of maintaining the 1200°F. minimum combustion chamber temperature. It is apparent that a complete major renovation would be required to meet the federal air pollution standards.

6. Florida Avenue Incinerator

The Florida Avenue Incinerator, constructed in 1957, is a two-furnace, batch feed installation with combustion chambers, flues, and a single 10'-0" x 150' high chimney, which provides furnace draft and disperses the stack gases. Two three-ton, 2 cubic yard bucket overhead traveling cranes are used to feed refuse from the storage bin to the furnaces. Each furnace contains four cells and four hydraulically activated manually controlled rocker arm burning grates and dump grates. Each furnace is provided with a 15,000 cfm forced draft fan to supply undergrate combustion air and with auxiliary natural gas burners for additional furnace heat as required. A single wet trough with a drag flight conveyor is used for residue quenching and loading into open body residue trucks. A wet spray system is used for flyash control.

Plant records indicate that 75,062 tons, 75,845 tons, and 64,835 tons of refuse were processed in 1965, 1966 and 1967 respectively.

The refuse storage pit contains 1400 cubic yards of space at tipping floor level which is equivalent to 280 tons of refuse at 400#/cubic yard. This represents 16.8 hours of storage at the nominal plant capacity of 400 TPD or 31.2 hours at the 1967 incinerator rate of 215 TPD. Considering plant downtime for breakdowns and repairs, the incineration rate at this plant is approximately 250 TPD which will provide 26.9 hours of storage space. This is sufficient to permit the pit to be cleaned out weekly.

The 2 cubic yard crane bucket will lift an average of 1250#/load. For a 400 TPD operation this represents a total of 640 loads/day or an average of one load every 2.3 minutes. For the 250 TPD actual capacity, the charging rate would be one load every 3.6 minutes. Assuming all furnaces are charged in approximately the first third of each cycle, the charging rate would be one load every 1.2 minutes if both furnaces are charged simultaneously. This rate would be adequate, however, if the burning rate were to be increased to 350 TPD or more, it might be necessary to use two cranes if both furnaces were to be charged simultaneously.

There are no furnace temperature records available at this facility. However, this plant is so similar to the 7th Street Incinerator that it can be safely assumed that operating experiences are similar with respect to temperatures in the furnaces and a furnace availability time of 70%.

The grate sizes of the two furnaces are 290 square feet each and combustion volumes are 6300 cubic feet. The grate size is adequate for the design rate of 200 TPD of 5000 BTU# refuse, but the furnace volume size is slightly shy of the 6750 cubic feet required. Combustion air required for the 200 TPD rate would be approximately 35,000 cfm of air for 150% excess air. A 15,000 cfm forced draft fan is provided, and additional air is needed to complete combustion. Approximately 40% of the air needed could be introduced over the grate, but the remaining 6,000 cfm should be undergrate air. The shortage of undergrate air may account for some of the poor residue quality.

Many batch feed incinerators operate exclusively with stack induced natural draft. Although it may be desirable to attempt this at this plant, the likelihood of success is hampered by the low stack temperatures caused by the use of wet spray chambers.

Furnace charging, burning, clean out and dumping are similar at this plant to the 7th Street plant except that the gas burners are used at this plant only when refuse is wet.

The furnaces, flues, etc. were inspected while the plant was shut down on a Sunday. Conditions at this plant were similar to those at 7th Street, except that one wall of one furnace had been repaired on a test basis with gunited castable refractory. This wall was repaired approximately six months before the inspection. A 10 square feet section of the repair had fallen out, and many cracks appeared in the wall, but it was too early to evaluate the effectiveness of the repair design. A bad hole in the discharge trough from one spray chamber caused leakage of water from the chamber as well as leakage of air into the chimney.

The following observations and recommendations are offered:

a. The same comments relating to combustion air and furnace charging procedures which were offered for the 7th Street plant would apply to this incinerator.

b. Because this plant has only one chimney, both furnaces must be charged simultaneously to provide adequate draft during combustion process.

c. The single conveyor is a constant source of plant downtime and requires constant surveillance. If this plant is to continue operating without major alteration, it is suggested that the conveyor be removed and replaced with a direct dump into trucks or containers. However, instead of using the old ash tunnel for truck movement, it is suggested that the trucks or containers be backed under the residue hopper perpendicular to the old ash tunnel. This change will keep the truck motors and cabs out of the spray and dust from the residue discharge operations.

d. An effort should be made to reduce the dumping and clean out time which is excessive. Recommendations a and c will help to accomplish this. If this time is reduced and furnace efficiency increased, it may be necessary to add another crane operator on each shift.

e. According to the Air Pollution Control Equipment table, settling chambers are capable of removing 40-60% of the flyash produced. Between 90% and 95% removal would be required to meet the federal air pollution standards.

7. Algiers Incinerator

The Algiers Incinerator, constructed in 1962, is a single furnace traveling grate plant with a water spray cooling chamber, mechanical cyclone flyash collector, and a short metal stack and induced draft fan. The furnace, which is nominally rated at 200 TPD contains two traveling grates. An inclined grate is used for feeding, drying, and igniting, and a horizontal grate is used for burning and discharge into a wet trough conveyor. A four-ton, 2 1/2 cubic yard bucket overhead traveling crane is used to transfer refuse from the 1200 cubic yard storage pit-- 240 tons of capacity-- to the continuous feed, water jacketed furnace charge hopper. The furnace is provided with a total of 35,000 cfm combustion air @ 5 1/2" water gauge pressure which is distributed over and under the grate through overfire nozzles and undergrate plenum chambers. The combustion air fan is driven by a 40 hp. motor.

After cooling with water sprays to approximately 500°F., gases from the furnace pass through a mechanical cyclone collector designed for 90,000 cfm @ 500°F. with 3 1/2" water gauge pressure drop which theoretically removes all particles over 10 microns in size. The gases are drawn through the collector by an induced draft fan designed for normal operations at 90,000 cfm @ 500°F. @ 4" water gauge and maximum loads of 112,000 cfm @ 500°F. @ 6" water gauge. The fan is driven by a 150 hp. motor.

Plant records indicate that 40,480 tons, 43,382 tons, and 46,382 tons of refuse were processed in 1965, 1966 and 1967 respectively.

The refuse storage pit contains space for 300 tons of refuse @ 400#/cubic yard, which represents storage capacity for 36 hours at the design rate of 200 TPD or 72 hours at the estimated average operating rate of 150 TPD. This substantial pit capacity is adequate to permit frequent clean out of the storage pit and considerable flexibility in refuse deliveries to the plant.

The 2 1/2 cubic yard bucket will lift an average 1500#/load. For a 200 TPD operation, this represents a total of 267 loads/day or an average of one load every 5.4 minutes. Since this is a continuous operating furnace, the charging rate of one load every 5.4 minutes will apply. This is a very slow rate and represents a costly part of the operation.

Temperature records at this plant indicate combustion chamber temperatures are maintained between 1700°F. and 1900°F. regularly except during periods of breakdown and cooling chamber temperatures vary from 450°F. to 550°F. These are good temperature ranges since they indicate good gas combustion characteristics and good flyash collection control.

The grate size and arrangement result in a usable grate area of 280 square feet which is adequate for 5000 BTU/# refuse and a total combustion volume of 5000 cubic feet which is shy of the 6750 cubic feet desired. Combustion air required for a furnace of this design could be approximately 42,000 cfm representing 200% excess air. The fan installed is designed to provide 35,000 cfm of air which would indicate that more air would be required to meet the design capacity of the furnace.

Gas burners were installed at this plant for use only when refuse is wet but were removed due to excessive use. Residue is removed by a flight conveyor with an overhead return designed to pass through the furnace. This design is poor since it results in frequent fouling of the conveyor and requires the full-time presence of an additional man at each shift. There are plans to redesign this conveyor in the near future to eliminate this source of downtime and extra manpower.

After five years of operation, the horizontal grate has been renewed. The inclined grate has required only a minimum of maintenance and is still in good condition. The horizontal drive coupling has worn excessively and should be replaced quickly because the worn coupling contributed to the rapid deterioration of the horizontal grate. Except for the inside refractory flue wall near the cyclone breeching which has moved and is in need of repair and the roof arch, the refractories throughout this installation are in good condition and properly maintained. Individual cyclone parts, breeching, housing, and stack are all in need of repairs. The I.D. fan is in good condition.

At the time of inspection, the refuse appeared dry and of normal quality, the furnace was operating at design capacity, operating temperatures were good, but the residue quality was poor. The quality observed was reported as typical. Lack of combustion air, particularly under the grate, could account for this experience. This would confirm the calculations noted earlier indicating a need for additional combustion air.

The observed color of the chimney discharge was good indicating good combustion of gases (Note: This would indicate adequate overfire air for the amount of refuse burned, but more refuse is available for burning as indicated by the high proportions of combustibles in the residue). The operators reported that complaints from flyash were minimal. However, although this plant is acceptable at this time from an air pollution standpoint, tests at other similar installations indicate that this design would probably not meet the proposed new federal air pollution standards. According to the Air Pollution Control Equipment table, the mechanical cyclone efficiency varies from 75% to 90%. A collection efficiency of 90% to 95% would be required to meet the federal standard.

Records indicate high operating costs for this plant. The primary reason for the high cost is the plant size. As noted earlier, the crane operation was inefficient because the charging rate was slow. The same crane operator could feed two and perhaps even three furnaces. The same expensive labor cost conditions apply to other parts of the operations. If this plant were to be doubled in size, the unit operating cost would be reduced by 25% to 40% or to approximately $4.00/ton. Improvement in the residue conveyor design as proposed would probably reduce operating costs another 10% by eliminating one-man shift, and reducing plant downtime.

8. St. Louis Incinerator

This is an old facility which has been completely renovated with the installation of new furnaces and appurtenances. Although completed late in 1966, this plant has not performed satisfactorily and, therefore, has not been accepted by the City. We are advised that the difficulty in plant operation is caused by moisture carry over with the flue gases from the cooling sprays to the dry cyclones. This moisture causes severe corrosion of the cyclones and a buildup of flyash resulting in clogging which prevents operation.

The plant was not operating at the time of inspection and no operating experience is available for evaluation. For record purposes, a description of the plant is included in this report.

Two new furnaces each rated at 225 TPD have been installed. Each furnace contains two traveling grates, one inclined for feeding, drying, and ignition, and one for burning and discharge of residue. The exposed grate surface is 43' long by 6' wide for an area of 260 square feet. The furnace and combustion space available is 4500 cubic feet.

Combustion air is provided by two fans. An underfire fan which provides 15,000 cfm @ 4" water gauge pressure is powered by a 15 hp. motor, and overfire air is provided by a 25,000 cfm fan @ 4" water gauge powered by a 25 hp. motor. The overfire air is introduced partly at the grate level and partly over the bed of refuse. Furnace draft is provided by a 110,000 cfm, 6" water gauge pressure @ 600°F. induced draft fan powered by a 150 hp. motor. Flyash control is provided by a multi-cone mechanical dust collector which is preceded by water cooling sprays.

A new type of gas burner is provided which can introduce 10,000 cubic feet/hour of natural gas into the furnace at the top of the feeding stoker.

9. New Orleans East Incinerator

This is a new facility which was started up early in 1968. No operating experience is available and no evaluation can be made. For record purposes, a description of the plant is included in this report.

The plant contains two continuous feed reciprocating grate furnaces each rated at 200 TPD. The grates are 9' wide, are arranged in four steps, and provide 325 square feet of exposed grate surface. The total furnace and combustion chamber volume is 5800 cubic feet.

Combustion air is provided by an underfire forced draft fan with 20,000 cfm capacity @ 4 1/2" water gauge pressure driven by a 20 hp. motor and by an overfire air fan with 24,000 cfm capacity @ 10" water gauge pressure driven by a 50 hp. motor.

Combustion gases are cooled by water sprays and travel a long path to Multi-Tube cyclone collectors designed for 120,000 cfm @ 600°F., and 2.7" water gauge pressure draft loss. A 150 hp. induced draft fan is provided. The design collection efficiency of the Multi-Tube cyclone is reported as 90% removal of particulates containing a particle size distribution of 15% less than 10 microns and 35% less than 20 microns with a particulate specific gravity of 2.5.

The refuse storage pit can hold 1750 cubic yards or 350 tons of refuse at water level.

10. Recommendations Concerning Existing Incinerators (A. Michaels)

a. Revise plant refuse storage pit operations to permit cleanout of the pits at least once every two weeks. This can be accomplished conveniently by cleaning out one-half of a pit each week. This change will result in a cleaner operation and provide more storage space in case of breakdowns.

b. Modify equipment and/or operations to provide a better quality residue than is produced by the three plants evaluated. For Algiers, this would be accomplished by increasing the size of the forced draft fan capacity. For the Seventh Street and Florida Avenue plants, this would involve changes in operating procedure as described in the individual plant evaluations.

c. Provide a new fleet of residue trucks designed specifically for this severe service. Establish a replacement schedule based upon a two-year life cycle (two years of 24 hour/day service is equivalent to six years of one shift/day service).

d. Test the chimney emissions from the Algiers, St. Louis Street, and New Orleans East plants to determine conformance with either the New Orleans air pollution regulations when these are adopted, or the federal standards.

e. Modify the Algiers residue conveyor as soon as this plant can be closed down for repairs. This modification should reduce downtime and operating costs at this facility.

f. The Seventh Street and Florida Avenue incinerators are not designed to operate at rated capacity because of the lost time between batch charges. Although some improvement can be expected with operating technique changes, residue quality from these plants is poor, and will probably get worse as the character of refuse changes. These plants cannot be operated to meet anticipated air pollution standards without major renovation to the furnaces and appurtenances. Therefore, these plants should be completely renovated or replaced with continuous feed furnace installations and air pollution control equipment capable of meeting local standards.

g. As soon as refuse generation quantities indicate a need for additional capacity in the area served by the Algiers incinerator, enlarge this facility to reduce unit operating costs.

h. Although plant personnel are diligent and cooperative, there is an apparent lack of understanding by many of the operators of the principles of incineration. It is recommended that an incinerator operators' training program be established for all supervisory and operating personnel. Such courses are now being given by the American Public Works Associations, the US Public Health Service, and the ASME Incinerator Committee. It is suggested that these organizations be contacted for assistance in setting up such a training program.

i. At the request of the Sanitation Department, Model Incinerator Maintenance Schedules for both Continuous Feed and Intermittent Feed Plants have been included in Appendix III.

11. Incinerator Residue, Characteristics and Disposal

From the incinerator operating records we have determined the percentage of residue at each of the incinerators and have estimated its annual volume both in cubic yards and acre feet. The information for the New Orleans East incinerator is based on only 27 days operation in 1968, with residue volumes projected to a full annual operating basis. This information is shown in Table V-40.

The relatively high percentage of residue at Florida Avenue, Seventh Street and the Algiers incinerators makes it desirable to continue to dispose of this material at the dumps at Gentilly and Algiers and because of its relatively high organic content to provide cover over it to prevent nuisance. The lower percentage of residue and greater weight per unit volume indicate that the New Orleans East incinerator residue contains little unburned organic matter and should therefore be suitable as a fill material. It should be expected that the St. Louis Incinerator and both the reconstructed Florida Avenue and Seventh Street Incinerators should produce a residue comparable to that of New Orleans East.

If the proposed Schedule of Incinerator Improvements, Figure V-17, is followed, the residue requiring covering will reduce from 128-acre feet in 1968 to 35-acre feet by 1971 and the quantity of residue suitable for fill will increase from 25-acre feet in 1968 to 147 feet (240,000 CY) by 1971. These amounts will increase annually and by 1990 can be expected to reach 240-acre feet per year or about 400,000 CY. The residue produced during this period will fill 1000 acres four feet deep. The City can thus reclaim substantial areas of low land for public purposes and should make provisions to acquire such property before it is needed.

TABLE V-40

VOLUME OF INCINERATOR RESIDUE

	Year	Incinerated Tons/Yr.	Residue Tons/Yr.	% Residue Dry Basis	Approx. Wt. Lbs/CY	Est. Annual Volume Residue	
						In CY	Acre Ft.
Florida Ave.	1965	75,062	31,437	26.7	1100	57,000	35
	1966	75,845	30,579	24.0	1100	55,000	34
Seventh St.	1965	99,730	7,946	29.8	1050	91,000	56.5
	1966	98,185	50,204	31.7	1050	95,500	59
Algiers	1965	40,480	27,197	41.3	1000	54,500	33.5
	1966	43,382	28,966	41.5	1000	58,000	36
N. O. East	1968	6,800	1,951	17.3	1500		
Projected Annual Total		110,000	31,600			42,200	26

12. Fly Ash Characteristics And Disposal

The Algiers, St. Louis, and the New Orleans East Incinerators are each provided with cyclones for the removal of flyash from the flue gases. It is proposed that similar equipment be installed in the reconstructed Florida Avenue and Seventh Street Incinerators. To meet the air pollution requirements under the Federal Regulations approximately 29 lbs. of fly ash per ton of refuse burned must be removed from the incinerator gases before discharge into the atmosphere. On this basis the five incinerators would produce about 25 tons per day in 1970 increasing to something over 40 tons by 1990.

Although this material has certain pozzolanic characteristics which make it useful as a concrete additive, the relatively small quantities produced would preclude its sale to cement producers. Likewise the limited quantities available preclude its use as base for fertilizer manufacture. It has also been successfully used with lime as a road base material, however, the limited quantities produced would require that the material accumulate until a sufficient quantity is available for any given project. The dusty nature of the material would require that it be stored in closed containers thus adding materially to such costs. The present practice of flushing the fly ash from the cyclones into the residue quench tank for removal with the residue is probably, the best means of handling this material and should be continued.

13. Disposal of Non-Combustible Refuse

In addition to area required for residue and fly ash disposal, dumping area must also be provided for non-combustibles and oversize wastes which our survey shows amount to approximately 10% of the refuse collected by the City. This is about 12.5% of the total estimated production of non-combustible wastes produced in the area. Since there is a demand for refuse which can be used as fill, the bulk of this material will be delivered to other than municipal facilities. We believe that the City should anticipate receiving non-combustible and oversize waste at the rate of about 0.3 lbs. per capita, at present, with this amount gradually increasing to 0.4 lbs. per capita per day by 1990. Based on the estimated 1970 population, this would amount to 3,900 tons per year increasing to 6,850 tons by 1990. If this material is assumed to have a compacted weight of fifty pounds per cubic foot, the volume in 1970 would equal 5,800 cubic yards or about 3.5 acre-feet. This would increase to 10,000 cubic yards or about 6.5 acre-feet by 1990. Based on a four foot depth of fill, twenty five acres would be required for this material during the next twenty years.

14. Process Water

Water for each of the incinerators excepting the New Orleans East plant is taken from the city mains and waste water is discharged into storm drains. In 1967 the estimated charges for water and sewer service together with the quantities recorded are shown

TABLE V-41
WATER AND SEWER CHARGES IN 1967 BASED ON MONTHLY CONSUMPTION

Incinerator	Annual Consumption in Gallons	Water Charge	Sewerage Charge
St. Louis	10,881,000	$1,772.96	$ 952.48
Florida Avenue	20,773,000	$3,385.68	$1,743.84
Seventh Street	18,026,000	$2,916.16	$1,524.08
Algiers	3,121,000	$ 531.36	$ 331.68

NOTE: Charges for service not actually made.

It should be pointed out that the St. Louis Incinerator operated a total of only 28 days during 1967, thus giving a daily rate of 388,000 gallons, about 10% more than that required for reducing the temperature of the gases from the combustion chamber to the 600°F. required for the operation of the cyclones. On this basis full annual operation of this incinerator would require 122,000,000 gallons of water. Consideration should, therefore, be given to the installation of wells and pumps at this incinerator relieve the water system of this heavy load. Also consideration should be given to installing treatment facilities for the waste water prior to its discharge to the sewers.

The 3,121,000 gallons consumed at the Algiers plant appears to be seriously in error since it represents only about 10% of that required to control the gas temperature for the cyclone operation. The annual water demand at this plant should be approximately 50,000,000 gallons. Consideration should also be given at this plant to the installation of both wells and pumps and to the treatment of waste water.

The New Orleans East Incinerator has two wells, each equipped with 500 GPM pumps for its water supply needs, and a lagoon for removing the solids from the waste water before discharge into an outlet canal.

Water supply wells and pumps, together with waste water treatment facilities, will be required at both the reconstructed Florida Avenue and Seventh Street Incinerators and provision has been made in the estimates of cost for each of these plants for such installations.

E. Air Pollution Control Requirements

1. General

Until recently little if any attention has been given in the United States to the control of stack emission and complaints from neighbors of soot and flyash have been common. However, with the realization of the hazards and health and economic losses caused by air pollution and the adoption of air pollution control codes by a number of states and metropolitan areas there has been a marked increase in the installation of air pollution devices in incinerators.

A survey undertaken by the American Society of Mechanical Engineers Incinerator Committee in 1965 showed that since 1959 no incinerator has been constructed without some air pollution control device. This survey also showed the trend toward more sophisticated equipment as regulations have become more stringent.

In most of the larger incinerators operating today, flyash control devices are limited to subsidence chambers with or without baffles. Both the baffles and the chamber bottoms may be either wet or dry. In some, sprays are employed both to cool the gases and to aid in trapping particulate matter.

Until recently code requirements generally considered satisfactory were those established by the American Society of Mechanical Engineers, which limited particulate emission to 0.85 lbs per 1,000 lbs. of gas at 50% excess air. These requirements could generally be met with the subsidence chamber baffles and sprays, provided that proper attention was given to plant operation.

There has been a marked increase in the last several years in the use of both cyclones and scrubbers as code requirements have been tightened

As the demands for cleaner stack emission increases, the efficiency of the control devices must likewise increase. Based on an estimated 40 lbs. of flyash leaving the furnace per ton of refuse charged and 32 lbs. per ton entering the collector, collection efficiencies to meet code requirements are as shown in Table V-42.

In Table V-39 Mr. Michaels lists the relative efficiency of the various types of air pollution control equipment together with its basic limitations and comparative space requirements.

TABLE V-42
COLLECTION EFFICIENCIES - AIR POLLUTION REQUIREMENTS *

Code Requirements	Percentage of Efficiency Needed to Meet Code
0.85#/1,000 # @ 50% Excess Air	74
0.65#/1,000 # @ 50% Excess Air	80
0.20#/1,000 # @ 50% Excess Air	94
Clear Stack (Refractory Furnace)	96-97
Clear Stack (Water Cooled Furnace)	98.5

* From paper presented by Alan Walker, Technical Director, Research Cottrell at symposium entitled Incineration of Solid Wastes sponsored by the Metropolitan Engineers Council, March 21, 1967.

2. Guidelines and Regulations for Federal Buildings

Under the recent Executive Order 11282 issued by the President, May 26, 1966, guidelines were established for government installations relative to air pollution. This Executive Order established that the federal government would provide leadership in the nationwide effort to improve the quality of our air through the prevention, control, and abatement of air pollution from federal government activities in the United States. The Secretary of Health, Education, and Welfare was charged with administration of the Order and with promulgation of certain regulations concerning its functioning.

The objectives of this Order for federal facilities and buildings are given under Section 4 of the order and are quoted as follows:

> "(a) Except for discharges of radioactive emissions which are regulated by the Atomic Energy Commission, Federal facilities and buildings shall conform to the air pollution standards prescribed by the State or community in which they are located. If State or local standards are not prescribed for a particular location, or if the State or local standards are less stringent than the standards established pursuant to this Order, the standards prescribed pursuant to Section 5 of this Order shall be followed.

> "(b) The emission of flyash and other particulate matter shall be kept to a minimum.
>
> "(c) Emission of sulfur oxides shall be minimized to the extent practicable.
>
> "(d) Wherever appropriate, tall chimneys shall be installed in order to reduce the adverse effects of pollution. The determination of chimney height shall be based on air quality criteria, land use, and metereological, topographical, aesthetic, and operating factors.
>
> "(e) Solid fuels and ash shall be stored and handled so as not to release to the atmosphere dust in significant quantities. Gasoline or any volatile petroleum distillate or organic liquid shall be stored and handled so as not to release to the atmosphere vapor emissions in significant quantities.
>
> "(f) In urban areas refuse shall not be burned in open fires and in rural areas it shall be disposed of in such a manner as to reasonably minimize pollution. Refuse shall not be left in dumps without being covered with inert matter within a reasonably short time. Whenever incinerators are used they shall be of such design as will minimize emission of pollutant dusts, fumes, or gases.
>
> "(g) Pollutant dusts, fumes, or gases (other than those for which provision is made above) shall not be discharged to the atmosphere in quantities which will endanger health or welfare.
>
> "(h) The head of each department, agency, and establishment shall, with respect to each installation in the United States under his jurisdiction, take, or cause to be taken, such action as may be necessary to ensure that discharges of radioactive emissions to the atmosphere are in accord with the rules, regulations, or requirements of the Federal Radiation Council as published in the Federal Register.
>
> "(i) In extraordinary cases where it may be required in the public interest, the Secretary of Health, Education, and Welfare may exempt any Federal facility or building from the objectives of paragraphs (a) through (g) of this section."

In implementing this Order, Part 76 of Chapter 1 - Public Health Service, Department of Health, Education, and Welfare entitled "Prevention, Control, and Abatement of Air Pollution from Federal Government Activities: Performance Standards and Techniques of Measurement" was issued on June 2, 1966, by the Secretary. Section 76.8 concerning the Disposal of Refuse is quoted below:

> "(a) Refuse shall not be burned in open fires in urban areas. In nonurban areas there shall not be burned in open fires, within a 24-hour period, more than 25 pounds of material at a single site nor more than 500 pounds of material at any number of sites within a one-mile radius, except that these quantities may be exceeded when the open burning occurs at diverse sites such as are associated with railroad rights-of-way, interurban highways, irrigation canals, forests, agricultural operations, etc. Deteriorated or unused explosives, munitions, and certain hazardous materials may be burned in open fires, in accordance with recognized procedures. Refuse shall not be left in dumps without being covered with inert matter within a reasonably short time.
>
> "(b) Refuse shall be incinerated only in facilities specially designed for that purpose. Incinerators shall meet the emission visibility standards of 76.4 (a) (2) and (a) (3). In addition, for installations burning 200 pounds of refuse or more per hour, emissions shall not exceed 0.2 grain of particulate matter per standard cubic foot of dry flue gas corrected to 12 per cent carbon dioxide (without the contribution of auxiliary fuel), and shall not normally include particles larger than 60 microns. For installations burning fewer than 200 pounds of refuse per hour, emissions shall not exceed 0.3 grain of particulate matter per standard cubic foot of dry flue glass corrected to 12 per cent carbon dioxide (without the contribution of auxiliary fuel)."

Based upon the limitation of particulate emission to 0.20 grains per standard cubic foot of flue gas corrected to twelve per cent carbon dioxide, under the new regulations established by the Federal Government for use in Federal facilities, and assuming 30-40 lbs. of particulate matter issuing from the furnace per ton of refuse charged, compliance with the Federal limitations on particulate emission would require an overall removal efficiency of about 90 per cent.

3. Louisiana Air Control Law

Under Legislative Act of 1964 No. 259, the State of Louisiana established the Louisiana Air Control Law for the protection of the purity of the air of the State of Louisiana and created a Commission to carry out its provisions. The Commission was empowered to promulgate and adopt rules and regulations to reduce undesirable levels of air contaminants which appreciably injure human life beyond inconvenience or materially injure or interfere with reasonable use of animal or plant life or property. The Commission was authorized to control outdoor burning of waste material or refuse by issuing regulations establishing methods to be used. A public hearing and the written approval of four members of the Commission is required for the adoption, modification or repeal of any rule or regulation. The Law recognized the need for varying the level of undesirable air contaminants with the physical conditions of the area in question including type of development, zoning, classifications, topography, and prevailing wind direction and velocity, etc.

4. Requirements for New Orleans Incinerators

Although no specific limits of particulate emission or other air contaminants have been established by the Commission for the municipal incinerators of the City, the urban location of each of these incinerators in or close to residential areas makes a high degree of air pollution control mandatory.

The increasing consciousness of the public to dangers to health from air pollution has progressively increased the severity of air pollution control requirements. Since this trend can be expected to continue and since any improvements to the incinerators should be made anticipating future conditions, a high degree of air pollution control must be established. The County of Los Angeles has long recognized the need for street air pollution control because of the peculiar atmospheric conditions prevailing in the area. The Code regulating air pollution control measures within the County limits the particulate emission from stacks to 0.3 grain per standard cubic foot of dry flue gases at 12% CO_2. The results from the applications of these standard for particulate emission appears to have been satisfactory since they have been in effect for a number of years.

In view of the extensive development of heavy industry in the area, and the fact that no specific standards have been previously adopted under the State Air Control

Law we believe that the moderate standards such as those used by the County of Los Angeles will be satisfactory and should be adopted by the City of New Orleans and the Tri-Parish area for particulate emission from incinerator and other stacks. In addition to the 0.3 grain per cubic foot at 12% CO_2 for particulate emission, the regulations should also prohibit open burning of refuse and require it to be covered with suitable earth in accordance with the suggested requirements for sanitary landfill (See Appendix V).

If the City were to avail itself of a demonstration grant under Section 204, Title II, Public Law 89-272, the Solid Waste Disposal Act or a construction grant of up to two-thirds the construction cost under pending Federal legislation (HR 11405 and S 1646) the requirements as established by the Public Health Service of the Department of Health, Education, and Welfare would become a condition to such Federal participation. These regulations, in addition to limiting the particulate emission from stacks, to 0.2 grains per cubic foot at 12% CO_2 also prohibit open burning of refuse and require it to be covered with inert material within a reasonably short time when placed on dumps.

One of the conditions in accepting the Federal grant under which this study is being undertaken is that regulations to stop open burning are to be established and enforced within the Tri-Parish area. Such regulations would limit the amount of combustible refuse dumped on the landfills at Algiers and Gentilly to that for which inert cover material could be provided, and require that the remaining combustible matter be delivered to an incinerator for disposal. This would also apply to the dumps operated by private enterprise.

The adoption and enforcement by the City of the suggested air pollution limits of 0.3 grains per cubic foot at 12% CO_2 would, in effect, require the elimination of on-site incineration by industry, institutions, and commercial installations because the cost of installing, operating, and maintaining the necessary equipment would greatly increase the cost of this type of disposal. As a result, such wastes can be expected to be added to amounts presently being disposed of at the municipal incinerators.

Though no stack emission tests have been conducted at any of the New Orleans incinerators to determine particulate emission, both the Florida Avenue and the Seventh Street incinerators are of the batch type which could not be expected to approach such rigid requirements without extensive modification or complete reconstruction. The poor burn out and large percentage of residue mentioned in Mr. Michaels' report are further reasons for modifying or reconstructing these incinerators.

The Algiers, St. Louis, and New Orleans East incinerators are all of the continuous type and are provided with multiple cyclones for fly ash removal. Although these incinerators may not meet the suggested air pollution requirements for particulate emission, they should with careful operation be expected to approach these limits and result in a minimum of complaints from neighboring areas and thus not justify any further expense for air pollution at this time.

F. First Stage Refuse Disposal Program 1970 to 1980

1. Present Incinerator Capacities

The City of New Orleans has five incinerators and two landfills which receive the refuse collected by the City and a substantial part of that collected by private haulers. Studies of the operation of the Florida Avenue, Seventh Street, and Algiers incinerators show these incinerators to have average operating capacities of 250, 325 and 150 tons per day, respectively. Each of these capacities is based on operating experience.

In the case of the reconstructed St. Louis Incinerator, the New Orleans East Incinerator and those proposed under this program, consideration must be given to the maximum months of refuse production in determining the effective average capacity. In Table V-43 is shown the monthly percentage variation in refuse collection over the past three years together with a three-year average.

TABLE V-43

MONTHLY VARIATION IN MUNICIPAL WASTE COLLECTION

Percent of Average

Month	1965	1966	1967	Avg. 3 yrs.
Jan.	93	94	94	94
Feb.	86	90	89.5	88
Mar.	100	102	103	101
Apr.	101.5	103	98	101
May	99	105	107	103
June	104	107.5	106	106
July	108.5	109	109	108
Aug.	109.5	111.5	112	110
Sept.	104	106	99	103
Oct.	95	96	96	95
Nov.	94	94	88	91
Dec.	102.5	101	98	100
				100

From the above it will be noted that June, July, and August are the months of maximum refuse production and that during this period collections are about ten percent greater than the annual average. Since an incinerator must be able to handle the month of maximum production at its rated capacity, its average effective capacity must be correspondingly reduced. On this basis an average effective capacity of 410 tons per 24 hours has been assigned for the St. Louis incinerator and 365 tons per 24 hours for the New Orleans East incinerator thus making the total present average incinerator capacity 1500 tons per day.

Waste production has been estimated as shown in Table V-44. Estimated quantities of incinerable refuse for both a six and a seven day week are given since both waste collection and incineration are on a six day basis and the larger quantities must be handled.

TABLE V-44

ESTIMATED QUANTITIES OF INCINERABLE REFUSE
(Tons/Day)

Year	7 Day Basis	6 Day Basis
1967	1360	1585
1970	1450	1690
1975	1655	1930
1980	1885	2200
1985	2200	2565
1990	2530	2950

2. Proposed Program of Development

Any proposed development program should provide additional capacity that will be sufficient for at least a 10-year period (1980). The capacity of the St. Louis, New Orleans East, and Algiers incinerators has been established on an annual average basis as 925 tons per day. This would require an additional effective average incinerator capacity of 1275 tons per day to be provided. In order to provide for peak months the rated incinerator capacity would have to be at least 1400 tons per day.

Since both the Florida Avenue and the Seventh Street incinerators are of an older design that cannot be readily modified to meet proposed air pollution standards, and since both plants are well located with respect to their respective collection areas, these incinerators should be reconstructed, modernized and continued in operation. Consideration should be given to reconstructing these incinerators with the same rated capacity as at present, namely 400 tons per day each and a new 600 ton per day incinerator constructed on a new site to provide the total required capacity, or the existing plants could be enlarged so that they would provide the additional capacity necessary.

Based on the cost per ton for incineration shown in Figure V-7, the reconstruction of the Florida Avenue and Seventh Street incinerators at their present capacity with a new incinerator at some other location providing the necessary additional capacity, the average operating cost would be approximately $0.70 per ton more than if the present incinerators were enlarged to provide this needed capacity. In 1975 this would amount to about $220,000 per year increasing to about $280,000 in 1980. In addition, since any new incinerator would have to be located in an industrial area at a greater distance from the points of collection than the present plants, the cost of haul would be increased substantially, further increasing the cost of disposal under such a plan.

We have, therefore, based the proposed Program of Development on the enlargement of both the Florida Avenue and the Seventh Street Incinerators. Each of the proposed plants will be located so as to incorporate the existing storage pits and high walls surrounding them into the enlarged plant thus saving the most expensive part of the existing plant structure. Due to the difference in furnace configuration between the existing and proposed furnaces, new furnace supports and foundations will be required. Also, the layout of gas conditioning and pollution control equipment will require both special supports and foundations. These and other considerations, therefore, make it impossible to determine to what extent other portions of the existing structure may be utilized until detailed plans for the proposed incinerators are worked out.

Taking into account the relative size of the two sites, the capacity provided should be approximately in the ratio of 2 to 3.

If furnaces with a unit capacity of 300 tons per day were utilized, two units at Florida Avenue would provide 600 ton capacity there and three units at Seventh Street would give 900 ton capacity at that installation. The total additional capacity on this basis would be 1500 tons per day. The additional 100 ton capacity above the minimum needed by 1980 would permit taking the Algiers Incinerator out of service for enlargement which will be needed by 1975 to take care of the projected growth in that area.

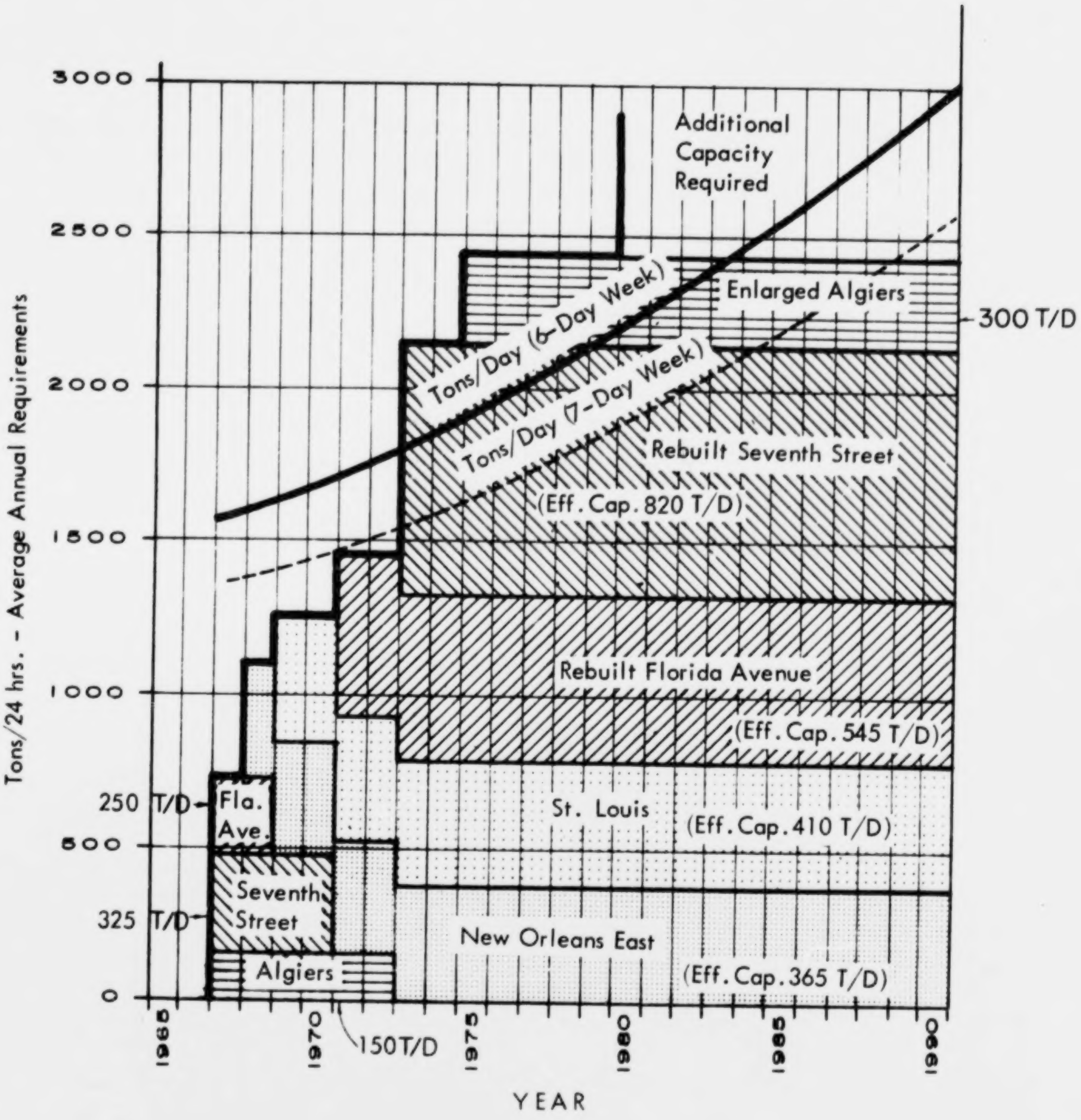
It is therefore proposed that both, the Florida Avenue and the Seventh Street incinerators be reconstructed and enlarged to have a rated capacity of 600 and 900 tons per day respectively, after which the Algiers incinerator can be doubled in size.

Since the Florida Avenue incinerator has a smaller actual capacity than the Seventh Street plant and is in need of substantial repairs and modifications, if it is to continue in operation, it should be the first plant scheduled for reconstruction and enlargement. Its removal from service will cause the minimum reduction in the total available incinerator capacity.

Before this incinerator can be removed from service, however, the deficiencies in the St. Louis incinerator must be remedied and that plant placed in operation. After the enlargement of the Florida Avenue plant is completed and placed in service, the Seventh Street incinerator can then be reconstructed and enlarged. Once the enlarged Seventh Street incinerator has been placed in operation, adequate incinerator capacity to receive all combustible refuse generated within the City will be available so that further dumping of combustible material can be discontinued. This total capacity will be sufficient to meet the overall needs adequately until 1979, except for growth anticipated in the Algiers area which will require the enlargement of the Algiers plant before 1975.

The above program is presented graphically with a time schedule on Figure V-17 In preparing this graph we have assumed that the difficulties at the St. Louis incinerator can be rectified this year and the plant placed into service in 1969. Plans for the reconstruction and enlargement of the Florida Avenue incinerator should be completed in 1968 so that construction can be undertaken as soon as the St. Louis plant becomes operable. A two-year construction period has been allowed for the reconstruction at Florida Avenue to allow time for receiving bids and awarding contracts as well as time for trial operation and testing. This would permit placing the enlarged plant into operation in 1971 at which time plans for the enlargement of the Seventh Street incinerator should be ready so that construction can be started in 1971 and the plant placed in operation in 1973. The enlargement of the Algiers incinerator to double its present capacity has been scheduled for 1973 and 1974 so that it will become operable in 1975 when additional capacity is required in this area. Under this proposed program incinerator capacity to receive all combustible waste generated in the City will not be available until 1973.

This program which completes the modernization and enlargement of the present incinerators is adequate to take care of the needs of the City until 1983 when additional new incinerator capacity must be provided. Since a new site or sites must be selected



PROPOSED SCHEDULE OF INCINERATOR IMPROVEMENTS

FIG. V-17

for this additional incinerator capacity, both the size and location of these requirements will be considered in Chapter VII - "Master Plan for Refuse Disposal for the Tri-Parish Area."

The increase in capacity of both the Florida Avenue and the Seventh Street incinerators to 600 tons and 900 tons per 24 hours respectively permits delivering the refuse generated within the City to incinerators located within relatively short haul distances from the point of pick up. With relatively minor changes in the areas served by each incinerator as the City continues to grow, the load on each plant can be balanced so that all plants will carry a proper proportion of the load. The service area changes required by 1975 and covered in Section 3 will be adequate until 1985 when additional incinerator capacity must be provided. This is shown for the years 1975 to 1990 in Table V-45. Should, in the interim, actual operating experience require further modifications in service areas to better balance the loads among the incinerators, this may be accomplished by re-routing private and commercial waste and need not affect municipal collection.

TABLE V-45
SCHEDULE OF PROPOSED INCINERATOR UTILIZATION
(Tons Per Day - 6-Day Week)

		1975		1980		1985		1990	
District	Incinerator	Incin. Cap.	Collected	Incin. Cap.	Collected	Incin. Cap.	Collected	Incin. Cap.	Collected
Algiers	Algiers	300	172	300	210	300	262	300	346 300 46
Central	7th Street	820	424	820	448	820	491	820	535
Night	7th Street	—	146 570	—	162 610	—	184 675	—	204 739 46 29 814
Western	St. Louis	410	315	410	342	410	378	410	418 29 389
Eastern I	Florida Ave.	545	492	545	543	545	615 -545 70	545	669 -126 * 543
Eastern II	N.O. East	365	265	365	364	365	490 70 560 -365 195	365 New Incin.	615 365 250
TOTAL -	Tons/Day	2,440	1,930	2,440	2,200	2,440	2,565	2,440	2,787
Excess Cap.	Tons/Day	510		240		20			
Deficiency	Tons/Day							-347	

* To St. Bernard Parish

3. Anticipated Income

The proposed refuse disposal program is based upon the establishment by the City of a policy to permit no further burning of refuse on open dumps and to limit dumping of combustible refuse to that which can be properly covered daily. Under this program most combustible refuse would be delivered to an incinerator for disposal. Our survey indicates that about 45% of all incinerable wastes is handled by other than municipal forces for which, under the newly adopted regulations, a charge of $4.00 per ton would be made by the City. Although under the proposed program, capacity to receive all this waste will not be available until 1973, an increasing quantity of private or commercially collected refuse can be expected to be delivered to the incinerators as the savings in haul cost becomes more apparent. By 1973 if the entire estimated volume were delivered for disposal by incineration and a charge were made of $4.00 per ton, the annual income to the City would be approximately $1,250,000 and by 1990 the amount would be approximately $1,650,000 per year. Since burying of combustible refuse would be considered permissible a certain portion of this type of refuse would continue to be dumped and buried for disposal thus reducing the income to the City from this source.

4. Proposed Incinerator Design Criteria

Using as a guide the analysis of refuse shown in Table V-26, (page V-51) and making certain adjustments to compensate for the unusually dry period when samples were collected, we developed the design criteria for both, the Florida Avenue and Seventh Street incinerators. These are shown in Table V-46.

TABLE V-46
DESIGN CRITERIA
FLORIDA AVENUE & SEVENTH STREET INCINERATORS

	Florida Ave.	Seventh St.
Incinerator Capacity, Tons/Day	600	900
Storage Pit Capacity, C.Y.	3000	4500
Number of Bridge Cranes	2	2
Capacity of Bridge Cranes, Tons	5	5
Size of Grag Bucket, C.Y.	3 1/2	3 1/2

	Florida Avenue	Seventh St.
Weighing Scales		
Capacity, Tons	50	50
Platform Size, Feet	50 x 10	50 x 10
Type	Automatic Printer	Automatic Printer
Number of Furnaces	2	3
Size of Furnace Unit Tons/Day	300	300
Water Supply		
Number of Wells	2	3
Capacity of Well, GPM	600	450
Waste Water Treatment		
Sedimentation Time, Min.	30	30
Capacity Required, C. F.	1200	1800
Number of Units	2	2

	Both Incinerators (Each Furnace)
Rating of Furnace Unit Lbs/Hour	25,000
Furnace Feed	Chute water jacketed
Characteristics of Refuse	
Non-combustible %	12.5
Moisture %	25.0
Combustible %	62.5
Heat Value	
Combustible, BTU/Lb.	8,000
Refuse as fired BTU/Lb.	5,000
Heat Release, BTU/Cu.Ft./Hr.	12,500
Furnace Volume, Cu. Ft.	10,000
Maximum Temperature Outlet Gas °F.	1,800
Grate Area	
Loading, Lbs/Sq. Ft.	60
Area, Sq. Ft.	417

	Both Incinerators (Each Furnace)
Spray and Baffle Chamber	
Spray Pressure, psi	50
Outlet Temperature °F.	600
Water Required, GPM	300
Subsidence and Reaction Chamber, C.F.	5,300
Air Pollution Control Equipment	
Type	Multiple Cyclones
Efficiency %	90
Combustion Air Fans	
Undergrate Capacity, cfm	45,000
Discharge Pressure, In. of Water	6
Overfire Air Capacity, cfm	30,000
Discharge Pressure, In. of Water	4
Induced Draft Fan	
Capacity, cfm	230,000
Discharge Pressure, In. of Water]	8
Stack	Masonry Stack
Residue Handling	Dual quench tanks with drag chain Storage hopper with gate

5. Estimate of Project Cost

The following estimates of cost are based on currently prevailing prices (Spring 1968) and reflect the savings in construction cost due to utilizing portions of the existing plants. No allowance for escalation in cost of the Seventh Street incinerator has been made due to its being programmed for construction at a later time.

Our estimate is shown in Table V-47.

TABLE V-47

ESTIMATE OF COST - FLORIDA AVE. & SEVENTH ST. INCINERATORS

		Florida Ave.	Seventh St.
Capacity		600 Tons	900 Tons
Site preparation incl. demolition		$ 50,000	$ 100,000
Foundations		300,000	450,000
Building		475,000	800,000
Mechanical			
a. Cranes		220,000	220,000
b. Furnaces		1,250,000	1,875,000
c. Cyclones		180,000	270,000
d. Water treatment and piping		100,000	150,000
e. Stacks and induced draft fans		240,000	335,000
f. Wells and pumps		50,000	75,000
Electrical		90,000	135,000
	Sub Total	$2,955,000	$4,410,000
Contingencies 10%		295,000	441,000
	Sub Total	$3,250,000	$4,851,000
Engineering Design 6%		195,000	291,000
	Sub Total	$3,445,000	$5,142,000
Engineering Supervision			
a. General 2%		65,000	97,000
b. Resident		30,000	30,000
	Sub Total	$3,540,000	$5,269,000
Legal & Miscellaneous 2%		71,000	105,000
	Sub Total	$3,611,000	$5,374,000
Interest during construction 4%		144,000	215,000
	Total Estimated Cost	$3,755,000	$5,589,000
	Say	$3,750,000	$5,600,000

6. Cost of Operation and Maintenance

The proposed new Florida Avenue incinerator will be of the continuous charging type similar to the present Algiers plant. The labor cost for its operation should be similar. Its larger size will require two crane operators instead of one; however, with certain design improvements some of the labor costs at the Algiers plant could be eliminated thus compensating for the additional crane operators. The cost of utilities and repairs have been proportioned in relation to the size of the two plants and the cost of residue removal has taken into consideration the improved quality of residue anticipated. For the purpose of comparing costs with those appearing in Tables V-17 (page V-37) and V-18 (page V-38) amortization has been based on 20-year 3 1/2% level debt service and the cost of amortizing both the present and proposed plant has been included. These costs (1967 basis) are shown in Table V-48.

TABLE V-48

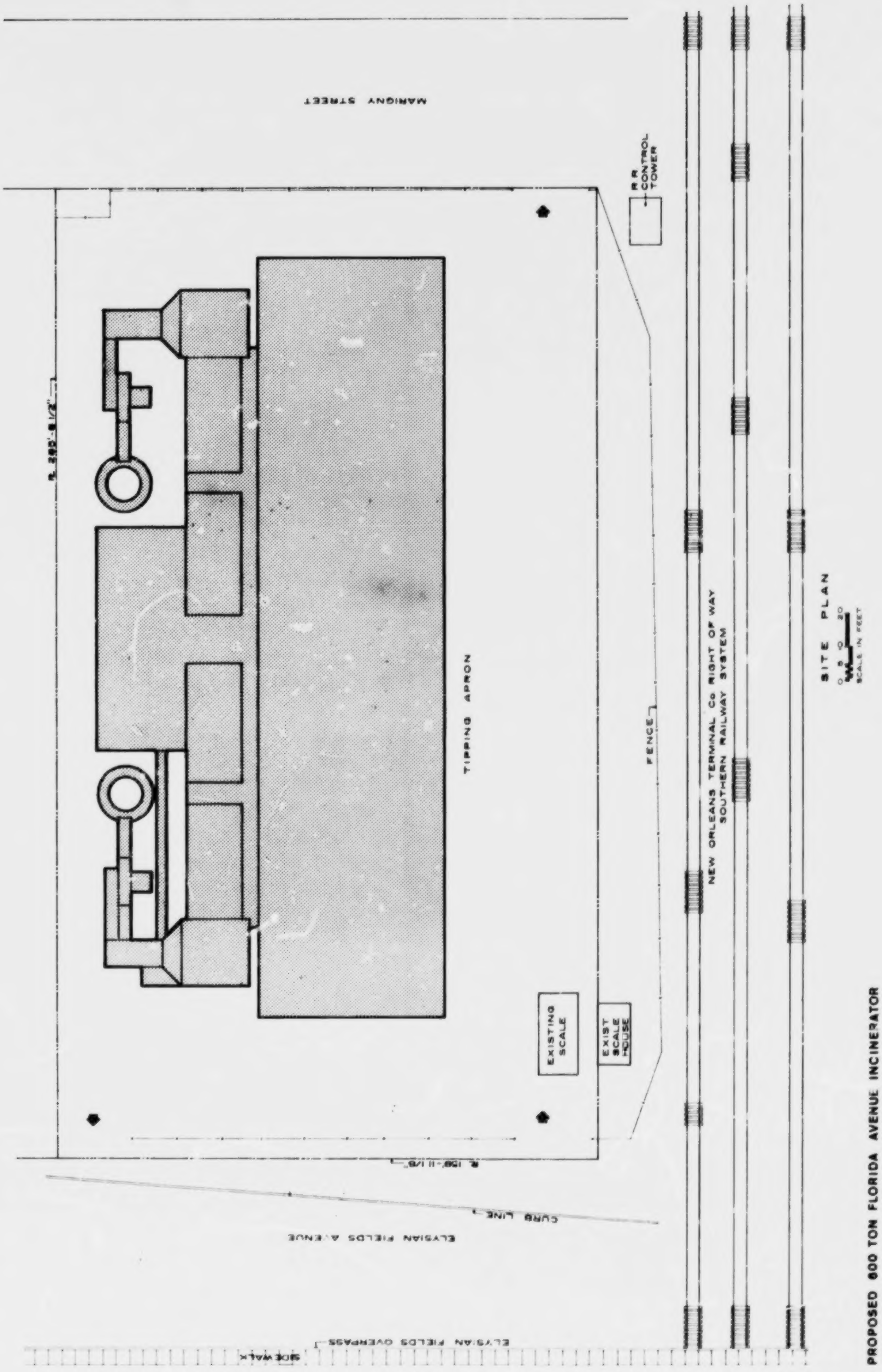
ANNUAL OPERATING COST
FLORIDA AVENUE INCINERATOR

Labor and Fringe Benefits	$186,000
Utilities	30,000
Repairs	60,000
Residue Disposal	30,000
Amortization new plant	253,000
Amortization existing plant	47,800
Annual Operating Cost	$606,800

Based on the quantities shown on Table V-45 to be delivered to the proposed Florida Avenue Incinerator in 1975 of 153,000 tons per year, the cost per ton for incineration would be $3.97 and the cost for 1980 with an estimated 165,000 tons delivered to the incinerator and with retirement of the bonds covering the original plant cost would be about $3.40. (If the current interest rate of 5% were used this would increase to about $3.60).

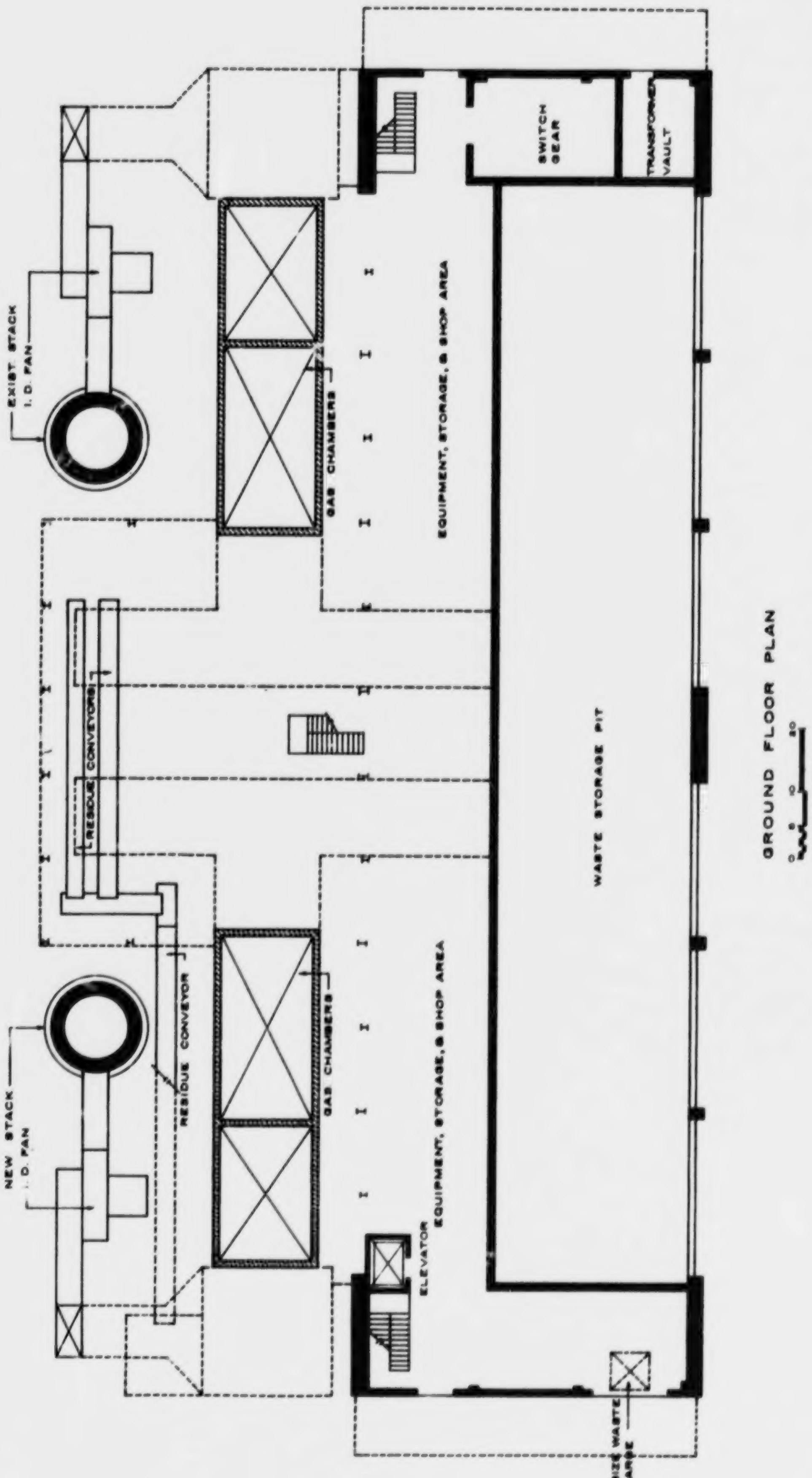
7. Proposed Layout

We have made some preliminary layouts of the proposed enlargement of the Florida Avenue Incinerator to a modern 600-ton/day incinerator capable of meeting the proposed limitations of air pollution. This layout proposes to utilize the refuse storage pit and certain other parts of the existing incinerator as well as the existing stack. The proposed site plan, the various floor plan elevations and sections as well as a perspective of the proposed enlargement are shown on Figures 18 thru 25 inclusive.


MARIGNY STREET
R.R. CONTROL TOWER
R. 280'-9 1/2"
TIPPING APRON
FENCE
NEW ORLEANS TERMINAL Co RIGHT OF WAY
SOUTHERN RAILWAY SYSTEM
EXISTING SCALE
EXIST SCALE HOUSE
R. 158'-11 1/8"
CURB LINE
ELYSIAN FIELDS AVENUE
ELYSIAN FIELDS OVERPASS
SIDEWALK
SITE PLAN
0 5 10 20
SCALE IN FEET

PROPOSED 600 TON FLORIDA AVENUE INCINERATOR
FOR THE CITY OF NEW ORLEANS, LOUISIANA

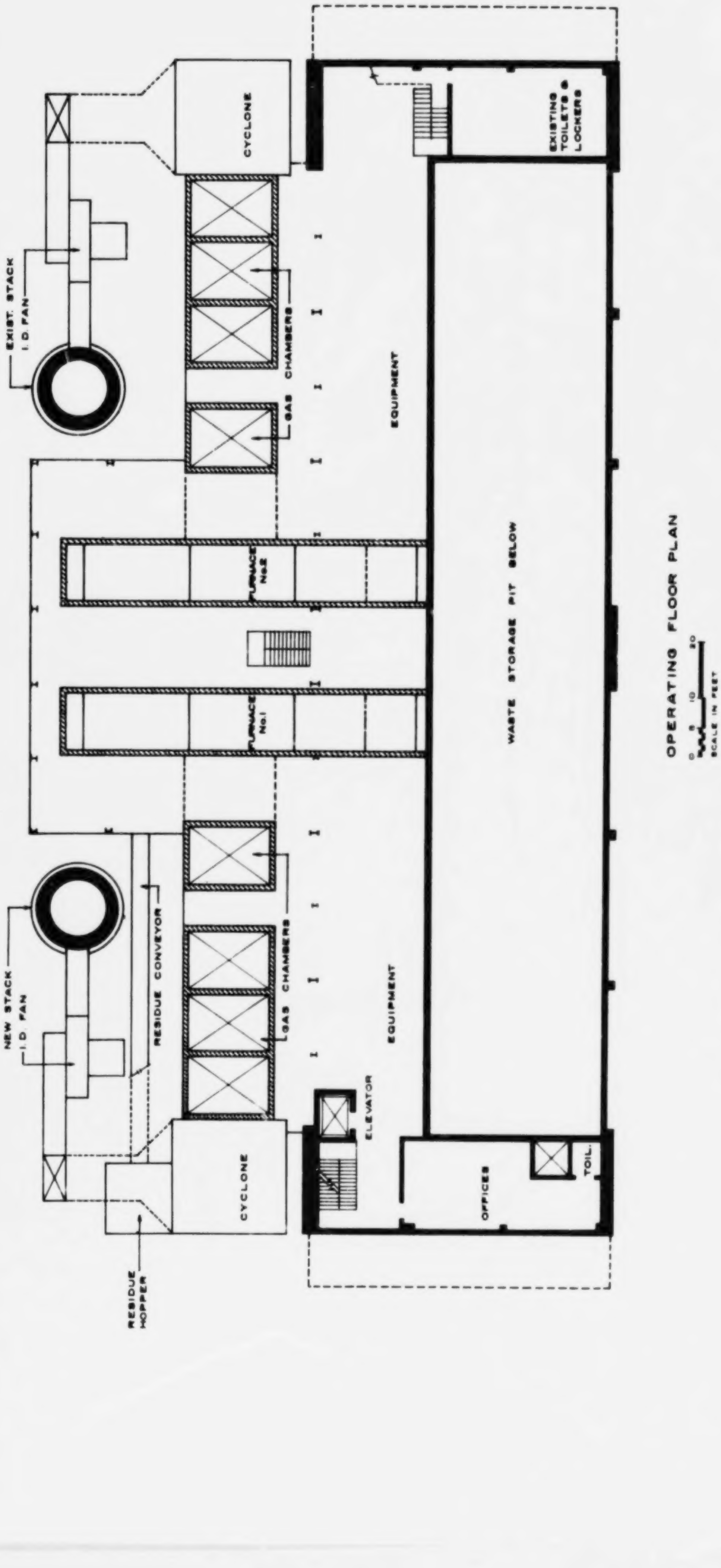
FIG. V-18


EXIST STACK
I.D. FAN
NEW STACK
I.D. FAN
GAS CHAMBERS
GAS CHAMBERS
EQUIPMENT, STORAGE, & SHOP AREA
EQUIPMENT, STORAGE, & SHOP AREA
RESIDUE CONVEYORS
RESIDUE CONVEYOR
ELEVATOR
OVERSIZE WASTE DISCHARGE
SWITCH GEAR
TRANSFORMER VAULT
WASTE STORAGE PIT
0 5 10 20
SCALE IN FEET

GROUND FLOOR PLAN

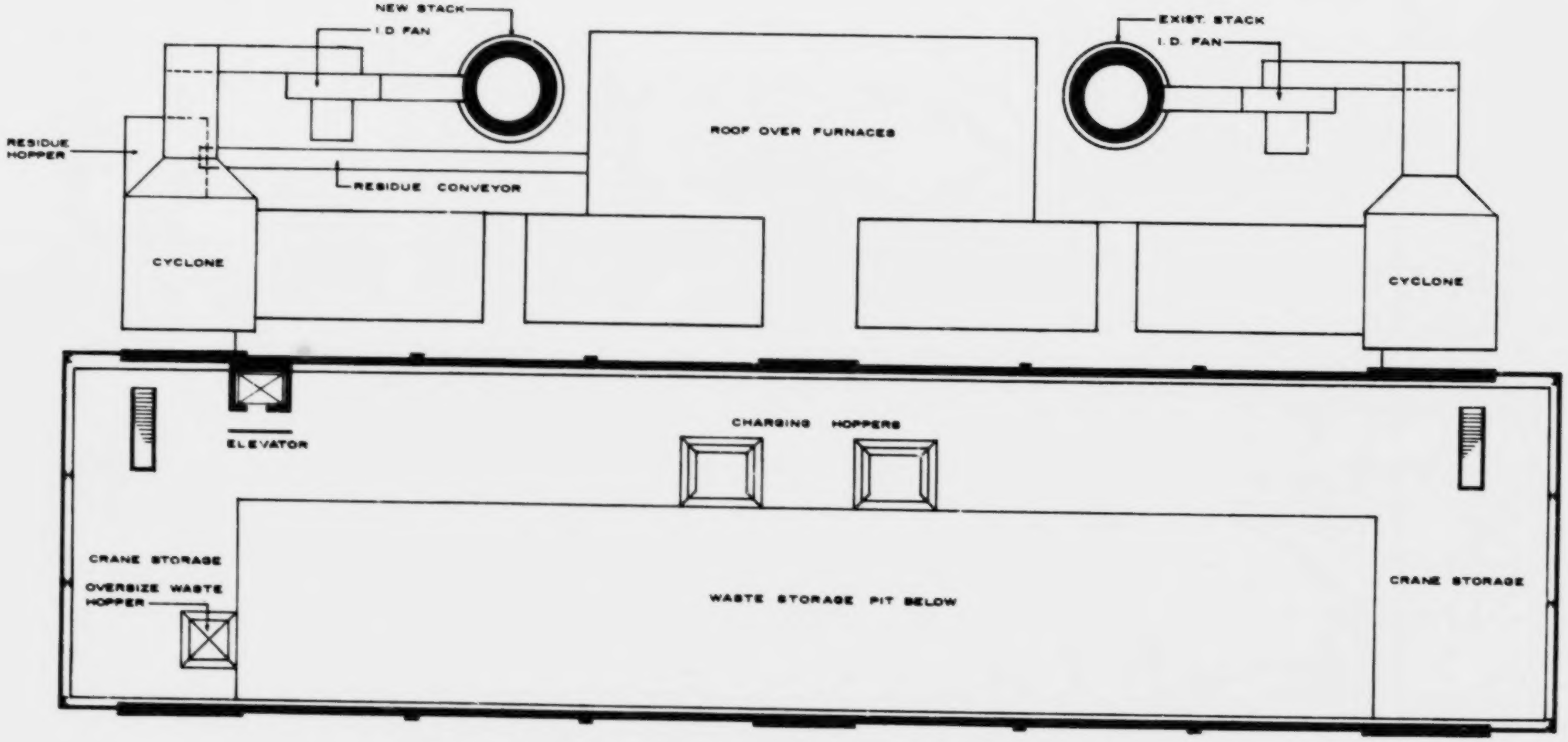
PROPOSED 600 TON FLORIDA AVENUE INCINERATOR
FOR THE CITY OF NEW ORLEANS, LOUISIANA

FIG. V-19
Page V-120


RESIDUE HOPPER
CYCLONE
NEW STACK
I.D. FAN
RESIDUE CONVEYOR
GAS CHAMBERS
EQUIPMENT
ELEVATOR
OFFICES
TOIL.
FURNACE No.1
FURNACE No.2
WASTE STORAGE PIT BELOW
GAS CHAMBERS
EQUIPMENT
EXIST. STACK
I.D. FAN
CYCLONE
EXISTING TOILETS & LOCKERS
OPERATING FLOOR PLAN
0 5 10 20
SCALE IN FEET

PROPOSED 600 TON FLORIDA AVENUE INCINERATOR
FOR THE CITY OF NEW ORLEANS, LOUISIANA

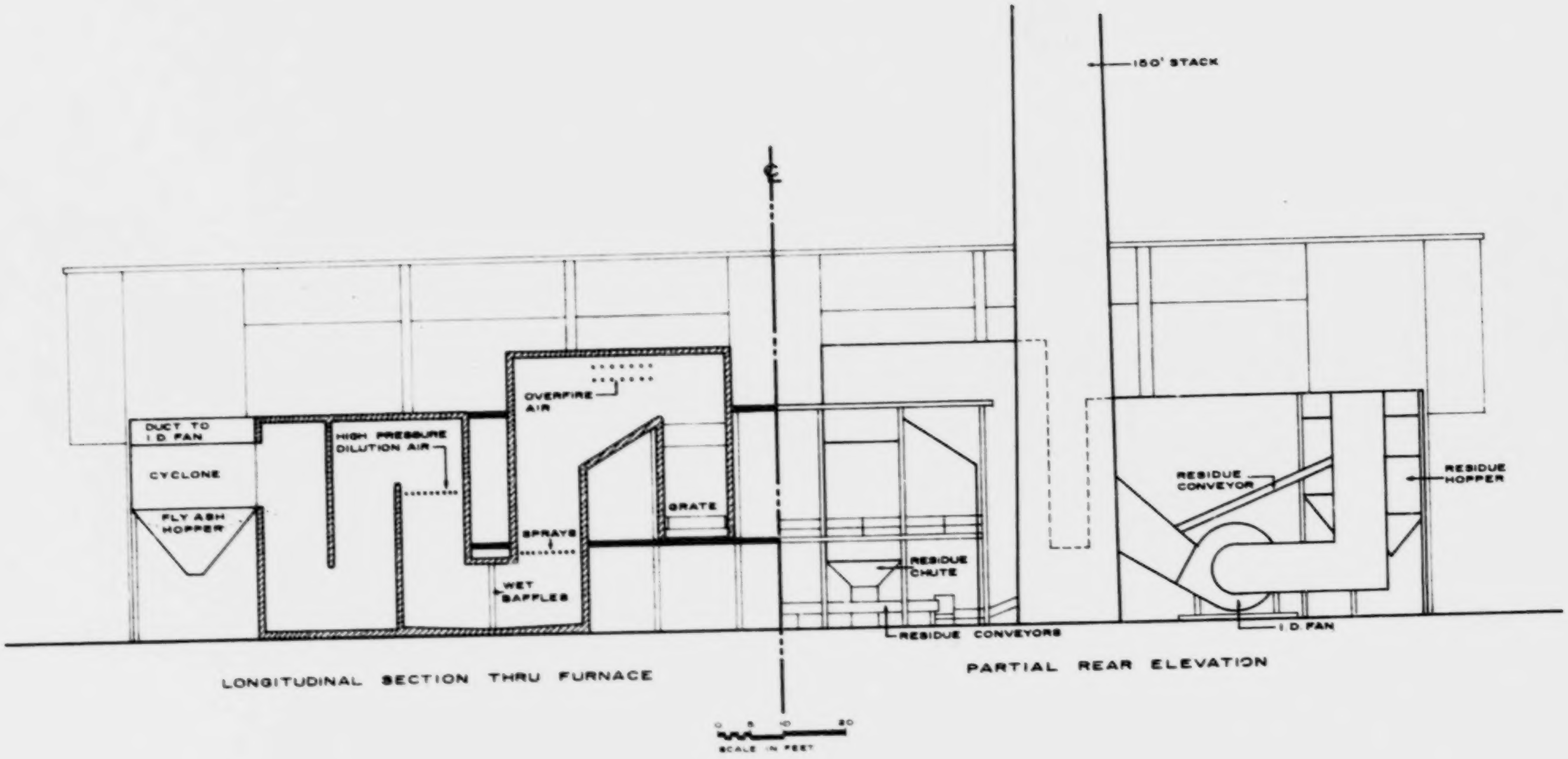
FIG. V-20


NEW STACK
I.D. FAN
RESIDUE HOPPER
RESIDUE CONVEYOR
CYCLONE
ROOF OVER FURNACES
EXIST. STACK
I.D. FAN
CYCLONE
ELEVATOR
CHARGING HOPPERS
CRANE STORAGE
OVERSIZE WASTE HOPPER
WASTE STORAGE PIT BELOW
CRANE STORAGE
0 5 10 20
SCALE IN FEET

CHARGING LEVEL PLAN

PROPOSED 600 TON FLORIDA AVENUE INCINERATOR
FOR THE CITY OF NEW ORLEANS, LOUISIANA

FIG. V-21


150' STACK
DUCT TO I D FAN
CYCLONE
FLY ASH HOPPER
HIGH PRESSURE DILUTION AIR
OVERFIRE AIR
SPRAYS
WET BAFFLES
GRATE
RESIDUE CHUTE
RESIDUE CONVEYORS
RESIDUE CONVEYOR
RESIDUE HOPPER
I D FAN
0 5 10 20
SCALE IN FEET

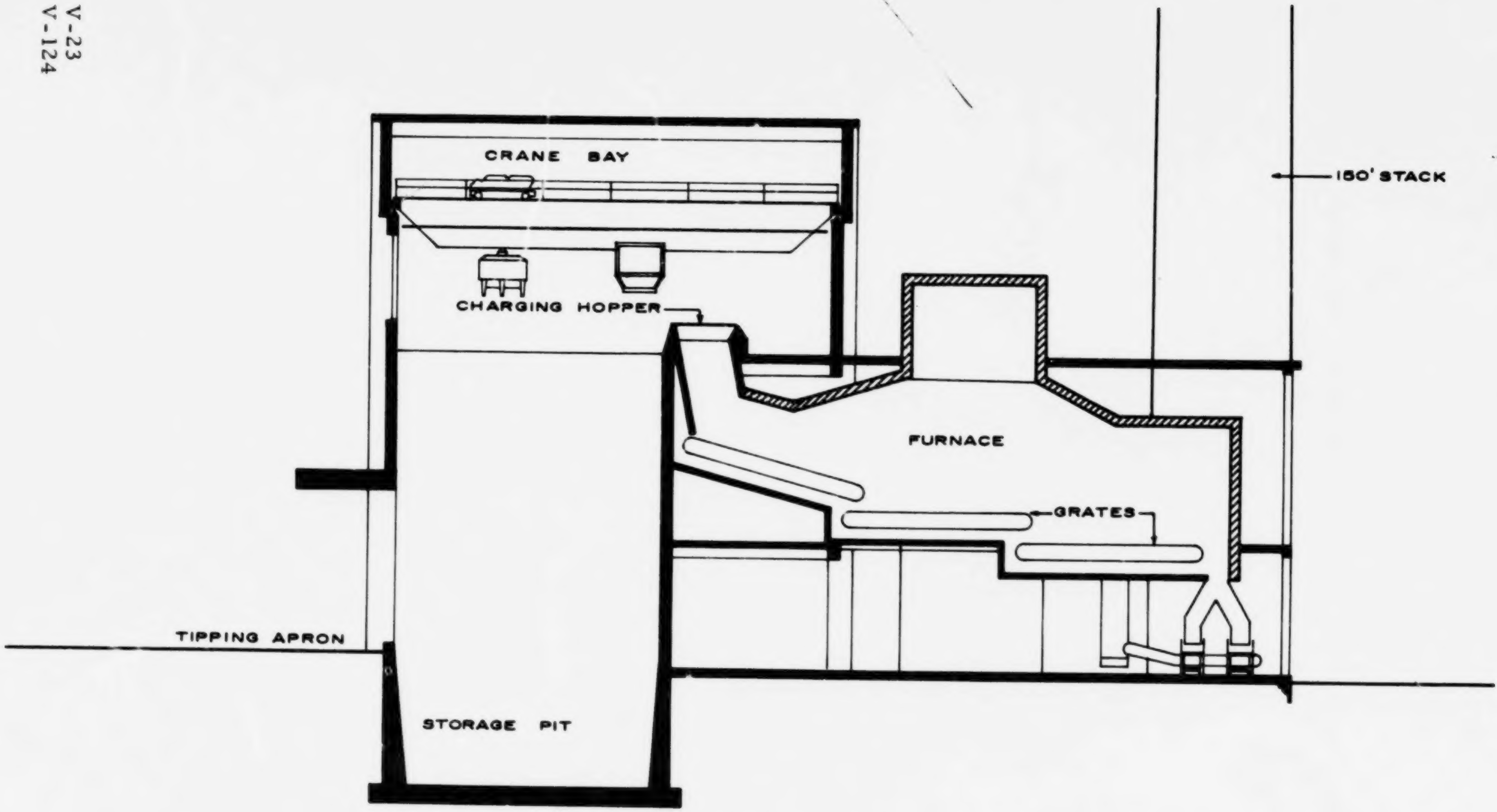
LONGITUDINAL SECTION THRU FURNACE

PARTIAL REAR ELEVATION

PROPOSED 600 TON FLORIDA AVENUE INCINERATOR
FOR THE CITY OF NEW ORLEANS, LOUISIANA

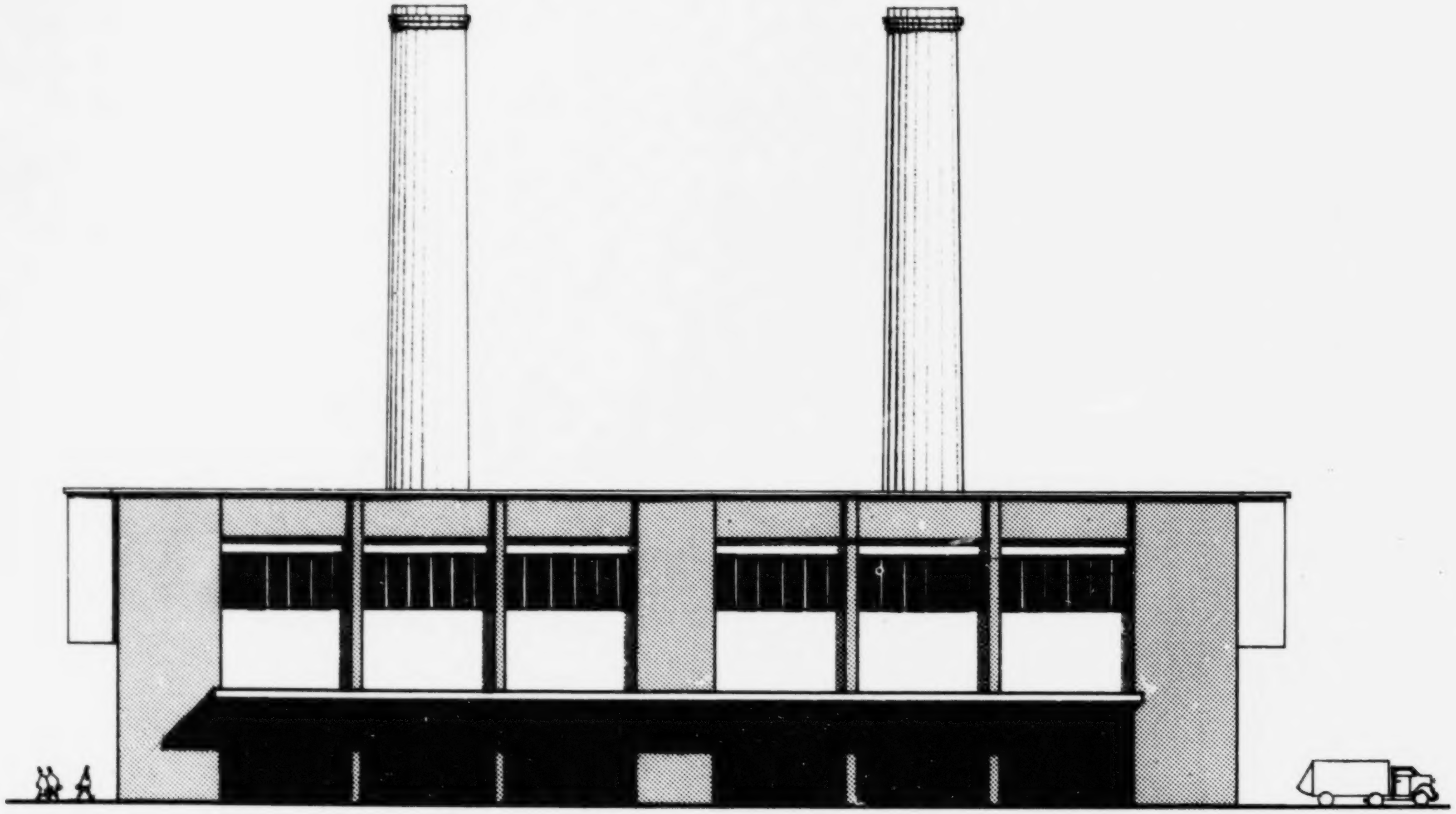
FIG. V-22

FIG. V-23


CRANE BAY
CHARGING HOPPER
150' STACK
FURNACE
GRATES
TIPPING APRON
STORAGE PIT
0 5 10 20
SCALE IN FEET

CROSS SECTION THRU FURNACE

PROPOSED 600 TON FLORIDA AVENUE INCINERATOR
FOR THE CITY OF NEW ORLEANS LOUISIANA

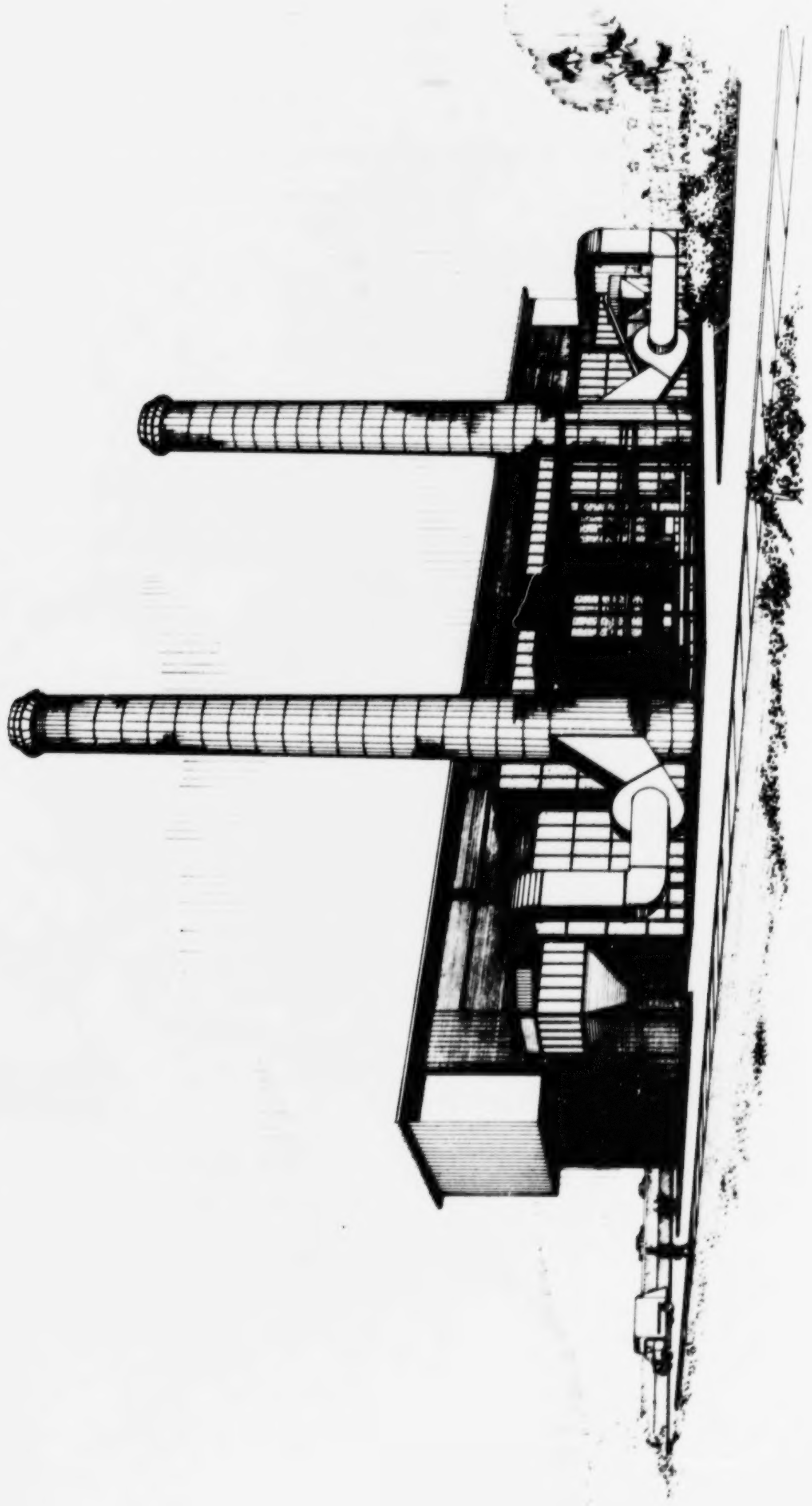


FRONT ELEVATION

0 10 20 40
SCALE IN FEET

**PROPOSED 600 TON FLORIDA AVENUE INCINERATOR
FOR THE CITY OF NEW ORLEANS LOUISIANA**

FIG. V-24



PROPOSED 600 TON FLORIDA AVENUE INCINERATOR
FOR THE CITY OF NEW ORLEANS, LOUISIANA

FIG. V-25
Page V-126

VI ST. BERNARD AND JEFFERSON PARISH

A. General

After brief review of the solid waste systems in St. Bernard and Jefferson Parishes, a field survey was conducted in early 1968 to determine quantities and types of waste generated in the area. These observations and investigations were made in each of the communities, except for the Westbank Unincorporated Area of Jefferson Parish which is covered by a separate study now in progress.

This Solid Waste Study of the Westbank Area is still in progress by the firm of Pepper and Associates, and on completion will supplement and complement our overall study of the Tri-parish Area. The Westbank Study in terms of its scope and the time interval of study has been divided into two phases. Its first phase consisting of the fieldwork covering the Unincorporated Westbank Area was conducted during the 1966-67 period. Though not presently in final form for detailed review, pertinent findings have been made available for the Tri-parish Study. The second phase consists of the 1968 in-depth study of the City of Gretna and the City of Westwego, and is not scheduled for completion until late 1968. Every effort has been made to coordinate the findings of that portion of the Westbank Study presently completed with the Tri-parish Study presented herein. Though our observations and analysis of the communities of Gretna and Westwego should precede the completion of that study, our findings have been submitted to the Westbank consultants for review and comments. It should be recognized that final results of the Westbank Study now in progress may affect the conclusions presented herein.

As noted in Chapter II, "Metropolitan Population", current population estimates and projections made by various local agencies in the Tri-parish Area show very wide variations, especially in the projections beyond 1970. Although accepted population estimates and projections were available for portions of this study dealing with New Orleans, and St. Bernard, in the case of Jefferson Parish, planning studies now in progress are not yet advanced to the point where it would provide "accepted" estimates and projections. Due to the time limits requiring completion of this study we have adopted population estimates and projection for Jefferson Parish of 925,000 by 1990, as shown previously in Chapter II. Distribution of population by communities within Jefferson Parish has been predicated on the past growth history, and current trends within each community.

Later in this report the effect of current and projected population estimates will be noted in the analysis of existing and future per capita waste production, as well as the analysis of existing per capita cost factors of collection and disposal services, presently experienced by the individual communities. These effects should be emphasized so that future use of this study will consider appropriate adjustments on the development of firm and accepted estimates.

B. Collection and Disposal Practices

In the course of our investigations in the Tri-parish Area, existing collection and disposal practices in each of the communities were determined, as well as pertinent data in system management. Highlights of our findings are presented in the following descriptions of each community.

1. City of Kenner (Jefferson Parish - Eastbank)

Collection and disposal of solid wastes in the City of Kenner is handled by a combination of municipal services and of private contractors. Garbage and trash collection of small commercial installations is picked up once a week by the City in an 18 cubic yard compactor truck. Time required for this service is 2 1/2 days (Monday, Wednesday, and one-half day Friday). Oversized waste from residential accounts is also picked up once a week by the City utilizing a 12 cubic yard stake body dump truck. Time allotted for this service is also 2 1/2 days (Tuesday, Thursday, and one-half day Friday). Combined garbage and trash collection from all residential accounts is handled under contract with a private disposal company. Equipment utilized in this service consists of four 18 cubic yard compactor trucks. Original requirements of this contract were for all pickups to be made on Monday, Wednesday, and Friday. However, recent modifications to this contract allow the contractor to pick up one-half of the City on Monday, Wednesday, and Friday, and one-half on Tuesday, Thursday, and Saturday. This modification was due to the frequency of equipment breakdowns which were affecting the reliability of collection for the entire City.

All wastes hauled by the disposal company and all garbage collected by the City are taken to a private landfill in St. Charles Parish. Trash, (excluding garbage) collected by the City is taken to a landfill adjacent to the St. Charles - Jefferson levee on the parish line.

Cost of this service to the recipients is assessed on the basis of seven mils per one thousand dollars of assessed valuation of real property. Within the City of Kenner, assessed valuation of real property consists of the following:

Type of Property	Assessed Value
Residential	$10,000,000
Commercial	$ 2,000,000
Public Utility	$ 7,500,000

The mileage rate on the total sum of $19.5 million assessed valuation of real property produces between $130,000 and $140,000 a year. This amount represents the total monies budgeted for collection and disposal costs of solid wastes by the City of Kenner. Actual costs incurred by the City for this service are within the budgeted amount. For 1967 the approximate costs were as follows:

Services	Annual Cost 1967
Private contractor services (approximate)	$ 84,000
Operating cost of City collection equipment	$ 16,000
Total cost of collection and disposal services	$100,000

Based upon a population of 35,000, the per capita cost in 1967 for total collection and disposal services averaged $2.85 against an allocated amount of $3.85 per capita. With the classification of properties and their respective assessed values, this service costs the owners of residential property $69,300 (51.3%), the commercial property owners $13,900 (10.3%) and public utility companies $51,800 (38.4%) during the year.

2. City of Harahan (Jefferson Parish - Eastbank)

Collection and disposal of solid waste in the City of Harahan is principally handled through the services of a private contractor with municipal forces handling only oversize wastes. Collection of garbage and trash from both household and small commercial installations is provided three times per week by the contractor. The City is divided into two areas, one receiving service on Monday, Wednesday, and Friday and the other area on Tuesday, Thursday, and Saturday. Private contractor equipment utilized in this service consists of two compactor trucks of 20 cubic yard capacity, one 8 cubic yard capacity flat bed trash truck, and one three quarter ton pick-up truck, all radio equipped.

All wastes collected by the private contractor are delivered to the Eastbank incinerator which principally services the Unincorporated Eastbank area of Jefferson Parish. Working arrangements have been made between the City of Harahan, the Parish Government and the contractor for disposal of waste collected in the City of Harahan.

Cost of this service to the recipients is assessed on the basis of 5 mils per $1,000 of assessed valuation of real property and a monthly service charge of $0.45. Within the City of Harahan, assessed valuation of real property consists of the following:

Type of Property	Assessed Value
Residential	$4,076,360
Commercial	$ 766,249
Public Utility	$ 381,640

The mileage rate on the approximate total of $5.22 millions, assessed valuation of real property produces about $26,000 per year. An additional amount of about $8,000 was generated through direct monthly service charges. This total of $34,000 represented the total monies allocated for collection and disposal costs of solid waste anticipated by the City of Harahan. Actual costs incurred by the City of Harahan for this service exceeded the allocated amount. For 1967 the approximate costs were as follows:

Services	Annual Cost 1967
Private contractor services (approximate)	$48,980

Operating cost of City collection equipment	$ 3,750
Total cost of collection and disposal services	$52,730

Based upon the 1967 population of 16,000, the per capita cost for total collection and disposal services in the City of Harahan averaged $3.30, against an allocated cost equivalent to about $2.15 per capita in 1967.

3. Jefferson Parish Eastbank Unincorporated Area

Collection and disposal of solid waste in the Eastbank Unincorporated area is generally handled by a private contractor. Contractual arrangements between the Parish Government and the service contractor requires this contractor to provide all equipment utilized in the collection service and operate the Parish owned and built Eastbank incinerator. Collection of garbage and trash from household and small commercial installations is provided two times per week. Collection equipment (all radio equipped) utilized in this service consists of the following:

17	Twenty cubic yard compactor trucks
1	Two ton stake body trash trucks
4	Three quarter ton stake body dump trucks

This contractor and other private haulers also serve the commercial and industrial accounts in the area.

Oversize waste in the area is picked up by the Parish. All wastes collected by the service contractor are taken to the Eastbank incinerator located on David Dr. off Airline Highway. A service charge has been established on commercial wastes received at the incinerator. Oversize wastes collected by the Parish are hauled to the Parish landfill located on the Jefferson Parish Westbank on U. S. Highway 90.

Cost of this service to the recipients is assessed on the basis of 5 mils per $1,000 of assessed valuation of real property, as well as through direct service charges. Eastbank recipients are subject to a $0.45 per month service charge. Total revenues generated for this service for the entire Parish in 1967 included $735,260 from property taxes, $347,503 from other tax sources (sales, etc.) and an additional $281,170 from direct service charges. This total amount of $1,363,933 represented total funds allocated for operating costs of the solid waste system for the Unincorporated Eastbank and Westbank area. Breakdown of income generated by each area was not available.

Estimated costs incurred by the Eastbank Unincorporated area for 1967 is estimated at approximately $805,000, including both the private contractor services for collection and disposal and the Parish cost in handling miscellaneous oversize waste. This cost to the Eastbank area excludes capital costs of the Eastbank incinerator which is equivalent to about $120,000 annually.

Based upon the 1967 population of 179,000 the per capita cost for total collection and disposal in the Eastbank Unincorporated area averaged about $5.15 during that year. With the combined population of the Unincorporated Eastbank and Westbank area estimated at 242,750 in 1967, total operating funds allocated for the solid waste system in the Parish were equivalent to an average rate of about $5.63 per capita.

4. Jefferson Parish Westbank Unincorporated Area

Collection of solid waste in the Westbank Unincorporated area is handled by the Parish Government. Collection of garbage and trash from household and small commercial installations is provided three times a week throughout the Unincorporated area, with the exception of the community of Terrytown, adjacent to the City of Gretna, which receives collection services only twice a week. Collection of oversize wastes is also provided by the Parish on a weekly basis, utilizing four stake body trucks in this service. Equipment utilized for garbage and trash collection consists of five 20 cubic yard, ten 16 cubic yard, and one 18 cubic yard compactor trucks.

Wastes collected by the Parish are taken either to the Parish landfill located on U. S. Highway 90 West, or the Parish incinerator located in the Marrero area. However, the majority of putrescible wastes are delivered to the incinerator for disposal.

Tax revenues produced in the entire Parish for the collection and disposal of wastes, as well as revenues generated from the direct service charges were reported earlier in the previous section covering the Jefferson Parish Eastbank Unincorporated area. Although the mileage rate on property is the same throughout the Parish, in the case of direct service charges to the recipients, variations occur in the Westbank area.

The Terrytown Community is charged on the basis of $0.50 per month with the balance of the Unincorporated area (generally located nearer the points of disposal) being charged at the lesser rate of $0.20 per month.

Cost of this service to the Westbank Unincorporated area in 1967 was approximately $420,000, excluding capital costs of the collection equipment and the incinerator plant, which are estimated at about $30,000 annually.

Based upon the 1967 population of 63,750 the per capita cost for total collection and disposal services in the Westbank Unincorporated area averaged about $7.05 during that year, compared to allocated operating costs equivalent to about $5.63 per capita for the entire Parish.

5. City of Westwego (Jefferson Parish - Westbank)

Collection and disposal of solid waste in the City of Westwego is principally handled by municipal forces. Collection of garbage from household and small commercial installations is provided on a daily basis with separate collection of rubbish and oversize wastes provided five days per week. Garbage collection services are provided by three 16 cubic yard compactor trucks with two stake body trucks being utilized in the rubbish collections. Private collection contractors, as in the neighboring communities, service the larger commercial and industrial accounts in the City of Westwego.

All municipal waste collections are delivered to the Westwego dump located immediately south of the City at the end of Central Avenue. Garbage, garden trash, and oversize wastes are delivered to this landfill for disposal by open dumping and burning. The Parish provides both equipment and labor in operation of this dump, at no expense to the City.

Estimated costs incurred by the City of Westwego for these services in 1967 were about $50,000 excluding capital cost for collection equipment, which is estimated at about $5,000 average annual expense.

Based upon the 1967 estimated population of about 14,000, the per capita cost for total collection and disposal services in the City of Westwego averaged about $3.93 during that year.

6. City of Gretna (Jefferson Parish - Westbank)

Collection and disposal of solid waste in the City of Gretna is principally handled by municipal forces. Collection of garbage and trash from both household and small commercial installations is provided three times a week, with one half of the City receiving service on Monday, Wednesday, and Friday and the balance of the City on Tuesday, Thursday, and Saturday. This service is provided by six 13-cubic yard compactor trucks operated by the City. Separate collection of garden trash and oversize waste is also provided by the City on a continuing cycle. This service requires the use of four 12-cubic yard stake body trucks and nine 6-cubic yard dump trucks. Private collection contractors service the larger commercial and industrial accounts.

All garbage collections from household and small commercial installations are delivered to the Gretna incinerator for daily burning. Garden trash and oversize waste (other than food waste) are delivered to the Gretna landfill for disposal by open dumping. Deliveries of putrescible wastes are prohibited at this landfill.

Costs of this service to the recipients is assessed on the basis of seven mils per $1,000 of assessed property values. The breakdown by types, classifications, and assessed value of taxable properties was not available. Funds generated from this assessment amounted to about $130,000 in 1967. This amount represents the total operating costs for collection and disposal of solid wastes as anticipated by the City of Gretna. Actual costs incurred by the City for these services in 1967 were $160,000 excluding capital costs for collection equipment and the incinerator plant which is estimated at about $40,000 average annual expense.

Based upon the 1967 estimated population of about 32,000 the actual per capita cost for total collection and disposal services in the City of Gretna averaged about $6.25 against allocated operating costs equivalent to about $4.07 per capita in 1967.

7. St. Bernard Parish

Collection and disposal of solid wastes in St. Bernard Parish is administered by the Parish Government. The Parish provides separate garbage pickup six days per week within the populated section north of the community of Poydras. Trash pickup throughout the populated area is on a continuing cycle varying from one to two pickups a week, depending on daily work loads.

The Parish collection fleet consists of two 18 and two 16 cubic yard packers, six 13 yard packers, and five 13 yard stake body trash trucks.

At present both garbage and trash collections are delivered to the public dump on Paris Road for disposal by open burning. During 1967, St. Bernard Parish built a new incinerator plant (100 ton per day capacity) a short distance south of this dump. Operation of this plant is anticipated during 1968 at which time it is intended to deliver all putrescible materials to this plant for disposal by incineration. In the sparsely populated area below Poydras, arrangements have been made with Plaquemines Parish for garbage pickup and disposal.

Private contractors provide collection services for commercial and industrial enterprises with disposal of these materials handled at both the public and private area dumps.

Cost of this service to the recipients is assessed on the basis of 4 mils per $1,000 of assessed valuation of real property. Within St. Bernard Parish assessed valuation of real property consists of the following:

Type of Property	Assessed Value
Residential	$27,500,000
Commercial and Industrial	$20,400,000
Public Utility	$ 8,900,000

The mileage rate on the total assessed property valuation of $56.8 million produces between $200,000 and $225,000 per year. This amount represents the total monies budgeted for collection and disposal costs of solid waste as anticipated by the Parish. In 1967 actual costs incurred for this service were within the budgeted amount, slightly below $200,000.

Based upon the 1967 estimated population of 46,380 the per capita cost for total collection and disposal services in St. Bernard Parish averaged about $4.30, against a budget allocation equivalent to $4.65 per capita. Based upon the classifications of properties and their respective assessed values the tax charge for this service cost the owners of residential property about $110,000 (48.5%) of commercial property $81,500 (35.9%) and Public Utility Companies $35,500 (15.6%).

C. Evaluation of Waste Disposal Facilities in the Area

With the cooperation of various officials in the Tri-Parish communities and/or their solid waste consultants, we had the opportunity to inspect the existing incinerators, review available plans and specifications and make observations of the various landfill operations in these communities. It should be noted that the concept of development of these facilities was based on needs of the individual communities and on conditions present at differing periods over a span of twenty years without any thought of future adaptability of these facilities to a regional program. The purpose of this evaluation is to present our findings on their adequacy, their present standards of operations, their possible enlargement or modernization to meet present and future needs and their adaptability to a long range regional program.

1. Incinerator Installations

a. Eastbank Incinerator (Jefferson Parish)

The 400-ton Eastbank incinerator is located on David Drive adjacent to the Airline Highway. The site (150' x 2,650') constitutes an area of approximately 9.0 acres. Based on the 1961 study by Godat & Associates, justification of this project was based on 1960 garbage and trash production of 64,040 tons on the Eastbank, consisting of approximately 38,000 tons of garbage collected by the Parish, 10,400 tons of trash collected by the Parish, and 15,700 tons of mixed refuse collected by commercial enterprises. Disposal at this time was by incineration and open dumping. Approximately 38,000 tons were incinerated at the old David Drive plant and some 26,000 tons handled by area dumps. In connection with this study, population and waste projections in 1975 were estimated as follows:

Population 346,800	
Garbage (Parish collected)	101,000 Tons
Trash (Parish collected)	27,600 Tons
Mixed refuse (collected by commercial accounts)	41,850 Tons
Total garbage and trash for disposal	170,450 Tons

During the course of this 1961 study, the solution to the problem of disposal called for an increase in incinerator capacity rather than disposal through landfill operations. This determination was based on the lack of sufficient land area located near or adjacent to good highways capable of handling the annual tonnage and cubic yardage volumes on a long term basis that would be within economic haul distances for collection trucks.

Incineration capacity was established based on a six-day operating week with an allowance of eight legal holidays and approximately five days downtime for the plant, or an effective operating year of 300 days.

At the time of the above study it was also anticipated that the original David Drive incinerator (presently abandoned) would be continued in operation with its then present average burning capacity of 120 tons and a possibility of improving its capacity to 150 tons per day. Therefore, based upon the 1975 annual waste forecast of 170,450 tons an incineration deficiency of 400 tons per day was calculated. After a comparison study of contemporary plant types, it was the opinion and the recommendation of the consultants to design the new 400-ton plant per day as a continuously fed plant with two, 200-ton rectilinear furnaces equipped with traveling grate stokers.

For design purposes the refuse characteristics were then assumed to have the following analysis:

Inert solid matter	12 1/2% by weight
Moisture content	25% to 40% by weight
Combustible matter	27 1/2% to 62 1/2% by weight
Heat content	8,000 BTU per pound dry of combustible matter

Plant facilities and site improvements included automated scales (20 ton capacity with a 24' x 10' platform) for weighing refuse inflow to the plant, paving, shelled parking area for employees, drainage and sewerage system, utility service and two-200 gallon per day deep water wells. As a part of this project the Department of Sanitation of Jefferson Parish also planned centralization of its administrative offices in the new incinerator building.

In conjunction with this plant, accessory facilities were also anticipated at this location consisting of storage garage for collection vehicles, maintenance facilities for the maintenance of the truck fleet, and a body and repair paint shop for the departmental vehicles.

Total cost of this plant on completion of construction in 1965 was $1,578,575 including engineering fees, but excluding land costs. In addition to this cost some $265,000 was expended in the development of accessory facilities for the collection division of Jefferson Parish Eastbank.

This incinerator is a double furnace traveling grate plant with water spray cooling chambers, mechanical cyclone flyash collectors, and twin metal stub stacks with induced draft fans. Each furnace is nominally rated at 200 tons per day and contain two traveling grates. Inclined grates are used for feeding, drying, and igniting and horizontal grates are used for burning and discharge into a wet trough conveyor. Two overhead traveling cranes of four-ton (2 1/2 cubic yard bucket) capacity are used to transfer refuse from the 1500 cubic yard storage pit (300 ton capacity) to the continuous feed, water jacketed, furnace charging hoppers.

Each furnace is provided with a total of 35,000 cfm combustion air at 5 1/2 inch water water gauge pressure which is distributed as overfire air (entering the furnace through nozzles located in the roof) and underfire air (entering the furnace through the grates and through side nozzles just above the burning grate). The forced draft system providing combustion air is powered by a 40 hp motor.

After cooling with water sprays to approximately 500°F., gases from the furnace pass through a mechanical cyclone collector. The gases are drawn through the collector by an induced draft fan designed for normal operations at 90,000 cfm at 500°F. at 4 inch water gauge pressure and maximum loads of 112,000 cfm at 500°F. at 6 inch water gauge pressure. Each fan is driven by a 150 hp motor.

The refuse storage pit (100' x 27' x 15' deep), containing space for 300 tons of refuse (@ 400 pounds per cubic yard), represents a storage capacity for 18 hours of burning, operating at a rated capacity of 400 tons per day. The plant, presently operating on a 16-hour day, is burning at an average rate of some 200 tons per day, which indicates an effective capacity of about 75% of the rated design.

The 2 1/2 cubic yard bucket will lift an average 1500 pound load. The present 200 ton per day operation over a 16 hour period indicates a total of 267 loads per 16-hour day are lifted daily or an average of one load every 3.6 minutes. Since this is a continuous operating furnace with only one crane operating, the charging rate of one load at 3.6 minutes will apply. This is a nominal rate and represents a reasonable cost in the overall operation, however, assuming this plant will, in the future, approach its rated capacity of 400 tons per day (in a 24 hour operating day), the requirements on the crane would be 534 loads per day or an average of one load every 2.7 minutes and would substantially reduce this cost component.

Total air requirements were calculated to provide a temperature of 2000°F. in the furnace while burning mixed refuse containing the highest moisture content (40%) and 1800°F. while burning dryer (25% moisture) mixed refuse. Equipment was selected to permit variation of the total amount of air flowing into the furnace between the values obtained from these calculations with provisions to insure that the underfire quantity would be held relatively constant.

Each furnace is equipped with auxiliary gas burners mounted on the roof of the furnace near the feeding end of the inclined grate. Burners are of the venturi type capable of delivering a maximum 30,000,000 BTU per hour per furnace at a gas pressure of 10 psi.

Each furnace is equipped with a dry type, multiple tube flyash collector, located between the subsidence chamber and the inlet of the induced draft fan. The collected particulate matter is continuously discharged through submerged outlets into the ash conveyor trench. Arrangement and size of cyclone tubes were selected to insure removal of virtually all material over 10 microns in diameter and not less than 65% of the material down to 5 microns in diameter.

Residue leaving the burning grate passes through a quenching trench and is transported by flight conveyor for deposit in the ash storage hopper. The 50 cubic yard ash storage hopper is located outside the incinerator building, permitting ash trucks to drive through for convenient loading.

Control instrumentation is designed to indicate pressures, indicate and record temperature, and in certain instances, to control functions of plant operation. Control equipment was provided to automatically, 1) maintain temperature of flue gases at approximately 500° F., 2)shut down forced draft fan and open relief vent damper if ID fan inlet temperature becomes too high or instrumentation operating air pressure is lost, and 3) maintaining temperature of furnaces between 1,600° F. and 2000° F.

Upon completion of the incinerator in 1965, observations of the plant operation were made by the design engineers. Initial operation was based on the three eight man crew shifts per day. Reported costs of operation during its initial operation period in February 1965 were comparable to $8.66 per ton operating at less than one third of its rated capacity. It was estimated a cost of $2.70 per ton can be expected when this plant approaches its rated capacity of 400 tons per day. This unit cost estimate excluded the costs of plant maintenance and residue removal.

We anticipate that this type of plant, with proper operation, will be capable of meeting the recommended standards contained in this report.

b. Westbank Incinerator - Marrero (Jefferson Parish)

The 90-ton Westbank incinerator located in Marrero is a relatively old facility constructed in 1947-48 at a cost of approximately $210,000 or about $2,300 per ton, including engineering fees, but excluding land costs. Located at the corner of Ames Road and Belle Terrace, this plant occupies a site (480' x 445') constituting an area of approximately 4.9 acres. The site, together with adjacent properties comprising a total of 17.86 acres, was acquired by the City in 1946 for a total purchase price of $8,000. Its location, about 1/2 mile south of the Westbank Expressway, is centrally situated within the developing unincorporated Westbank area. Accessory facilities on this site include maintenance garages for the Parish vehicles and offices for the Westbank garbage collection district.

Refuse is not weighed at this location. However, it is estimated that approximately 40 to 60 tons per day are burned in the two 8-hour shifts at this plant. The average crew size consists of five men including the ash truck driver. The plant is operated approximately 300 days per year.

The incinerator consists of a two furnace batch feed installation with combustion chambers, flues, and a single masonry stack to provide furnace draft and disperse the stack gases. No air pollution control equipment is provided. The plant is equipped with one 3 ton bridge crane with a 1 1/2 cubic yard clam shell bucket. Each furnace contains a single cell with burning grate and manually controlled dumping grate. This plant is not equipped with auxiliary burners. After burnout, the accumulation of residue is discharged direct to the ash hopper located directly below the furnace where it is manually quenched prior to direct discharge to the residue trucks. An access tunnel for trucks passes below the furnaces and it is necessary to move the ash trucks from one hopper to the next for receipt of residue.

The refuse storage pit contains a volume of about 300 cubic yards which is equivalent to about 60 tons of refuse at 400 lbs. per cubic yard. This storage volume represents 16 hours fuel reserve, operating at the rated plant capacity of 90 tons per day and is about equivalent to its actual working capacity at the present time, permitting frequent clean-out of the pit. Relatively no reserve storage capacity is available in the case of plant downtime due to breakdowns and repairs. However, with minimum mechanical features present in this plant, normal maintenance and repairs require minimum time and relatively little loss in operating time is experienced.

This plant is obsolete by today's standards of modern incineration. Based on annual average destruction of about 18,000 tons of refuse, it is estimated that it is operating at a unit cost of about $4.00 per ton including capital expenses, which is comparable to the unit cost limits experienced locally by the larger modern plant, at New Orleans East.

c. Gretna Incinerator (City of Gretna)

The 100 ton Gretna incinerator is located on the Belle Chasse Highway in the southerly portion of the City of Gretna. It is a relatively old facility, constructed in 1951-52 at a cost of about $200,000. Recent improvements have included the addition of air pollution equipment at a cost of some $35,000. The incinerator installation is situated on a three acre site which also contains facilities for the Gretna collection division. This plant is operated on a single eight hour shift basis, six days per week and about 300 days per year with a crew of 5 men including the ash truck driver. Refuse is not weighed at this location, but it is estimated the plant burns approximately 30 tons daily.

This plant, similar to the Westbank incinerator, is a two furnace batch feed installation with combustion chambers, flues and a single masonary stack 6 feet in diameter and 100 feet high to provide furnace draft and disburse the stack gases. It is equipped with a single 3 ton bridge crane with a 1 yard clam shell bucket.

The plant also provides for direct discharge of residue from the furnace to the ash hopper where it is manually quenched prior to discharge to the ash trucks.

A spray cooling chamber and fly ash collector was installed in 1967 in an effort to reduce this nuisance factor.

The 215 cubic yard refuse storage pit represents approximately 43 tons of refuse @ 400 pounds per cubic yard, or about 10 hours of storage, assuming operation at the rated plant capacity of 100 tons. This is adequate for the present actual working capacity of the plant. The established policy requires daily burning of all refuse received. This policy is adhered to and the storage pit is cleaned daily and sprayed to maintain excellent sanitary conditions. As in the Marrero incinerator, relatively little loss in operating time is experienced.

This plant, obsolete by today's standards of modern incineration experiences relatively high operating costs due to its small capacity and one shift operation. Based upon annual average destruction of about 9,000 tons of refuse, this plant is operating at a unit cost of about $5.00 a ton for incineration including capital expense.

d. Paris Road Incinerator (St. Bernard Parish)

The Paris Road incinerator is a new facility (not yet in operation) constructed at a cost of $548,000 or about $5,500 per ton, including engineering fees, but excluding land costs. No operating experience is available to date. For information purposes a description of this plant is included in this report.

The incinerator has a capacity of 100 tons per day and is located on an off-highway site (300' x 645') constituting an area of approximately 4.4 acres. Its location is in an undeveloped area, zoned for future industrial use. Accessory facilities on this site include a maintenance building for Parish vehicles. Site improvements include paved access roads and parking areas, as well as a scale installation for weighing of all refuse. Provisions for drainage of process water and surface drainage is through an open ditch system. Potable water supply, process water, and fire protection is provided from a 12 inch main leading to the property.

This facility consists of a single furnace traveling grate plant with water spray cooling chamber, mechanical cyclone fly ash collector, a single metal stub stack and induced draft fan. The furnace which is nominally rated at 100 tons per day, contains 3 traveling grates. An inclined grate is used for feeding, drying, and igniting. The first horizontal grate is used for primary burning and the second horizontal grate is used for final burnout and discharge of residue into a wet trough conveyor. Auxiliary gas burners are furnished at this plant for firing up of the incinerator and for use when refuse is wet.

A 3-ton overhead traveling crane is used to transfer refuse from the storage pit to the continuous feed, water-jacketed, furnace charging hopper. This crane, equipped with a one cubic yard clam bucket will lift an average 600 pound load. For a 100 ton per day operation a total of 334 loads per day or an average of one load every 4.3 minutes is required.

The 50' x 25' x 4' deep refuse storage pit contains space for 37 tons of refuse @ 400 pounds per cubic yard which represents storage capacity for 9 hours operation at the designed rate of 100 tons per day, or 10 hours at the estimated probable average rate of 90 tons per day.

The plant is designed to operate at combustion chamber temperatures between 1800 and 2000°F. The grate size and arrangement results in useable grate area of about 180 square feet. Design criteria assumed the heating value of refuse as fired would be about 4,230 BTU per pound. Design criteria also required 130% excess air to be supplied to control the temperature of the furnace exit gases. Total combustion air requirements were calculated at approximately 12,100 cubic feet per minute. The furnace is provided with a total of 18,000 cfm combustion air at 6" water gauge pressure, which is distributed over and under the grate through overfire nozzles and under grate plenum chambers. The combustion air fan is driven by a 20 HP motor.

After cooling with water sprays to approximately 500°F., gases from the furnace pass through a mechanical cyclone collector designed for 50,000 cfm at 500°F. with 5" water gauge pressure drop which theoretically removes all particles over 10 microns in size. The gases are drawn through the collector by an induced draft fan designed for normal operations at 50,000 cfm at 500°F. with 4" water gauge pressure and maximum loads of 60,000 cfm at 500°F. at 6" water pressure. The induced draft fan is driven by a 60 HP motor.

Residue leaving the burning grate passes through a quenching trench and is transported by flight conveyor for deposit in the ash storage hopper. The conveyor was designed to receive plant discharge from the furnace at any rate up to 3 tons per hour and at an operating speed of not less than 20 feet per minute. The ash storage hopper is located outside the incinerator building permitting ash trucks to drive through for convenient loading.

We anticipate that this type of plant, with proper operation, will be able to meet the recommended standards contained in this report.

2. Landfill Operations

Both private and public landfills which serve Jefferson and St. Bernard Parishes are generally operated as open burning dumps. Housekeeping and sanitation standards vary only slightly between these operations although considerable variation occurs in the types of wastes handled.

In St. Bernard Parish nearly all of the Parish waste collections are delivered to the public dump on Paris Road, a 200-acre tract, first started as a dump in the mid-forties and estimated to have a remaining life of some twenty-five years, if continued to be operated as in the past. This dump is located in marshlands and the progress of its development has been through continued burning of combustibles and dumping of non-combustibles in the submerged land areas. A private dump, operated in a similar manner, is located adjacent to the public dump and receives commercial wastes generated in both St. Bernard Parish and the City of New Orleans. Scavanging is practiced at both locations. Equipment usage for compaction and grading to maintain a reasonable appearance at these locations is not adequate and relatively no cover material is used other than the on-site residue.

Three active dumps presently serve the Jefferson Westbank. The Parish dump located on U. S. Highway 90 consists of about 50 acres. It is situated about 1.5 miles from the nearest development. This dump receives oversize and non-combustible wastes from the Eastbank as well as about 60% of the total wastes generated in the Westbank unincorporated area. The Gretna dump, consisting of about 2 acres, is located on Gretna Boulevard adjacent to developed areas. Policy of operation of this dump permits burning on a very limited basis under strict supervision. It receives approximately 40% of the wastes generated in the City, limited to non-putrescible wastes. It is one of the few area dumps operated on well drained land. The Westwego dump consisting of about 15 acres is located in marshlands off Central Avenue. It receives nearly all of the wastes generated in the City.

In addition to the Parish dump located on the Westbank, the Jefferson Eastbank is served by two other dump facilities. A private dump operated in St. Charles Parish receives about 80% of all wastes generated in the City of Kenner as well as limited amounts of commercial wastes from the balance of the Eastbank. The City of Kenner uses an area paralleling the Jefferson-St. Charles levee for the disposal of commercial trash and all oversize wastes. This dump covers an area of some 10 to 12 acres, averaging about 100 feet in width and about a mile in length. It is presently closed to public access but continues to be used by the City. There is no attendant on this dump and its method of operation presents considerable fire hazards. Due to its proximity to residential development and to the International Airport, burning has not been permitted, although the vast majority of materials are combustible. Neither compaction of wastes nor application of cover material is practiced at this location. Except for the prohibition of putrescible wastes, its method of operation presents the most hazardous conditions observed in the Tri-Parish area.

All seven of the area dumps, serving Jefferson and St. Bernard Parishes, are operated in a manner either in violation of existing ordinances or accepted methods recommended by health authorities. All present hazards, in varying degrees, to public health, welfare and safety. In order to eliminate these conditions, regulations must be adopted and enforced, not only prohibiting open dumping and burning, but also presenting minimum standards that must be met in operation of sanitary landfills and other methods of disposal acceptable to local, state and federal authorities.

D. Quantities and Types of Wastes

1. Present Quantities

Commencing in mid January of 1968, field observations were made over a period of some three weeks at the principal disposal facilities in Jefferson and St. Bernard Parishes as well as one dump located in St. Charles Parish where wastes generated in the City of Kenner were hauled for disposal. These observations excluded those disposal facilities in the Westbank Unincorporated area which were covered by the previous survey of Gerome Pepper and Associates in early 1966. These field observations included daily recordings of number of loads, type, size and capacity of delivering vehicle, classifications and weight of material received, as well as classifications of municipal or Parish collection and private collection vehicles. Observations covered an average period of fourteen days at each location with a minimum of eight days coverage at the private dump in St. Charles Parish where lesser volumes of materials were handled, to a maximum of seventeen days observation at the Eastbank incinerator where a great majority of the area tonnage was handled.

In addition to the disposal facilities noted above, one open dump located on the Jefferson - St. Charles Parish line, utilized by the City of Kenner for the disposal of miscellaneous waste, was not covered by continuous observations. However, it was estimated by the City of Kenner and reasonably verified by spot checking, that the City delivers, on the average, about 6.5 tons per day of mixed refuse (non-putrescible) wastes to this dump. Later estimates of total production for the City of Kenner will include adjustment for this one item.

In review of the Westbank Study, we find that recorded waste collections from the Westbank Unincorporated area averaged about 675 tons per week consisting of some 500 tons of Parish collected garbage and trash and some 175 tons collected by private and commercial haulers. It was also indicated that the Parish incinerator at Marrero was handling an average of about 240 tons per week with the balance of area wastes collected being handled at the Parish dump.

In addition to the waste from the Westbank, approximately 490 tons per week generated on the Eastbank were also delivered to the Westbank Parish dump.

For the purpose of this report and for comparison of each community, quantities of refuse production will be computed in tons and/or pounds per day (7 day week basis).

We find that the total refuse production in the total Eastbank area amounts to 366 tons per day of which 64% is collected by municipal forces (including private contractors providing municipal pickup) and the remainder by private disposal concerns. We also find that 218 tons per day were produced in the Westbank area of which 61% is collected by municipal and Parish forces. In St. Bernard Parish 76 tons per day were produced with 35% being collected by Parish forces.

Generally the private haulers collect all waste from the large commercial and industrial enterprises, in each of these areas.

The total quantity of refuse expressed in terms of per capita production amounts to an average of 3.19 lbs. per day in the Eastbank area, 3.97 lbs. per day in the Westbank area and 3.30 lbs. per day in St. Bernard Parish. A breakdown of our findings by individual communities, which is shown in Table VI-1, also includes the per capita figures for each community. It should be noted that the amounts recorded as municipal or Parish refuse also includes collections by private contractors which provide the public services in the Jefferson Eastbank area.

TABLE VI-1
TOTAL REFUSE PRODUCTION - 1967
(7 Day Week)

COMMUNITY	Municipal*		Priv. & Comm.		Total Per Day	
	Lbs/Cap	Tons/Day	Lbs/Cap	Tons/Day	Lbs/Cap	Tons/Day
St. Bernard	1.15	26.4	2.13	49.6	3.28	76
Jefferson Westbank						
Gretna	2.30	37.0	0.68	11.0	2.98	48
Westwego	2.92	21.2	1.37	9.8	4.29	31
Uninc. Area	2.37	75.2	2.00	63.8	4.37	139
Total Westbank	2.43	133.4	1.54	84.6	3.97	218
Jefferson Eastbank						
Kenner	2.08	36.0	0.57	10.0	2.65	46
Harahan) Uninc. Area)	1.95	190.0	1.33	130.0	3.28	320
Total Eastbank	1.97	226.0	1.22	140.0	3.19	366

*That part of the refuse for which the municipality assumes responsibility

The regular public garbage and trash collection services provided by the various communities through their own forces or through private contractors are largely limited to the collection of combustible wastes. In most cases special collections of oversize and non-combustible wastes are handled by separate collection crews and equipment. This type of material represents about 10% of the total wastes collected.

Summarizing our findings on the existing solid waste systems of Jefferson and St. Bernard Parishes, we have prepared Table VI-2, which relates annual costs incurred by each of the communities to the respective quantities of wastes produced and handled. Due to lack of cost accounting detail in these communities, we have necessarily estimated costs for the most part based on our observations and evaluation of those cost breakdowns available. In the case of incinerator costs, Table VI-3 was prepared to present the basis of these estimated costs.

In review of these tables it must be recalled that Jefferson Parish Eastbank communities are served primarily by private enterprise and that estimated costs shown do not propose to show actual contractor costs but only an approximate distribution of total community costs incurred, whereas in the case of Jefferson Westbank communities and St. Bernard Parish, estimated costs are those probably directly incurred by the communities. Variations in the estimated costs of collection and haul can be attributed to the variations in haul distances and/or frequency of collection, as in the case of St. Bernard Parish, which provides daily collections over a wide area with extreme haul distances.

TABLE VI-2
SOLID WASTE SYSTEM COST ANALYSIS
MUNICIPAL COLLECTION & DISPOSAL - JEFFERSON AND ST. BERNARD PARISHES - 1967

	Jefferson Parish Eastbank			Jefferson Parish Westbank			St. Bernard Parish
	Kenner	Harahan	Uninc. Area	(1) Westwego	Gretna	Uninc. Area	
Est. Population	35,000	16,000	179,000	14,250	32,000	63,750	46,380
Annual Tons Produced	13,300	5,700	63,500	7,600	13,500	27,400	9,700
Average Tons per Day Collected	44	19	212	25	45	91	32
Lbs/Capita (6 Day Basis)	2.42	2.27	2.27	3.40	2.69	2.76	1.34
Annual Collection & Disposal Costs	$100,000	$52,730	$925,000	$55,000	$200,000	$450,000	$200,000
Cost Per Capita	$ 2.85	$ 3.30	$ 5.15	$ 3.93	$ 6.25	$ 7.05	$ 4.30
Cost Per Ton	$ 7.53	$ 9.25	$ 14.50	$ 7.25	$ 14.82	$ 16.45	20.60
(2) Annual Tons Incinerated	-	5,000	55,000	-	9,000	18,000	-
Est. Cost/Ton	-	$ 4.62	$ 4.62	-	$ 5.38	$ 4.35	-
Est. Annual Cost	-	$23,000	$254,000	-	$ 48,350	$ 78,200	-
% of Total Collection	-	87	86	-	67	65	-
Annual Tons - Landfill	13,300	700	8,500	7,600	4,500	9,400	9,700
(3) Est. Cost/Ton	$ 1.50	$ 1.25	$ 1.25	$ 1.50	$ 1.50	$ 1.25	$ 1.50
Est. Annual Cost	$ 19,950	$ 875	$ 10,625	$11,400	$ 6,750	$ 11,750	$ 14,550
% of Total Collection	100	13	14	100	33	32	100
Est. Annual Cost of Disposal	$ 19,950	$23,875	$264,625	$11,400	$ 55,100	$ 89,950	$ 14,550
Average Cost/Ton	$ 1.50	$ 4.22	$ 4.17	$ 1.50	$ 4.10	$ 3.28	$ 1.50
Annual Comm. & Private Tons Received at Municipal Disposal Facilities	-	-	-	3,400	3,800	34,600	15,000
(3) Annual Cost of Disposal of Comm. & Private Collections	-	-	-	$ 5,100	$ 5,700	$ 51,900	$ 22,500
Est. Cost of Municipal Collection & Haul	-	-	-	$55,000	$139,200	$308,150	$170,450
Average Cost/Ton	$ 6.03	$ 5.03	$ 10.33	$ 7.25	$ 10.30	$ 11.20	$ 17.60

(1) Westwego Landfill is operated by Parish Sanitation Dept. - Cost of Disposal shown is not included in Total Annual Cost.
(2) Data from Table VI-3
(3) Allowance of $1.50 assumed for relatively small landfill preparations $1.25 at Westbank Landfill compared to average cost of $1.00/Ton at New Orleans' large landfill operations.

Note: See also Table III-2, Page III-6

TABLE VI-3
ESTIMATED DISPOSAL COSTS BY INCINERATION
JEFFERSON PARISH - 1967

	Eastbank Incinerator	Marrero Incinerator	Gretna Incinerator
Year Constructed	1964	1948	1951
Plant Cost	$1,578,575	$210,000	$235,000
Rated Capacity	400 T	90 T	100 T
Present Operation			
No. of Days/Week	6	6	6
No. of Hours/Day	16	16	8
No. of Men/Shift	6	5	5
No. of Tons/Day	200	60	30
Annual Tons Incinerated	60,000	18,000	9,000
Annual Costs			
(1) Capital	$ 112,000	$ 14,900	$ 16,700
(2) Operating	165,800	63,300	31,650
TOTAL	$ 277,800	$ 78,200	$ 48,350
Cost Per Ton			
Capital	$1.86	$0.83	$1.86
Operating	2.76	3.52	3.52
TOTAL	$4.62	$4.35	$5.38

(1) Capital expense for comparison purposes is based on Amort. Factor of .07036/yr. (For 20 yr. Life @ 3 1/2 % Int.)

(2) Operating expense is based on the following nominal allowances:

Payroll & Benefits: Salary Avg. of $400/Mo. per crew member
Utilities: Avg. $0.20/Ton Incinerated
Maint. & Repairs: Avg. $0.40/Ton Incinerated
Residue Removal: Avg. $0.25/Ton Incinerated

2. Forecast of Future Waste Production

In the case of our projections of per capita waste production in the City of New Orleans, we selected a 15% increase per decade over the next twenty-year period. We have adopted this same allowance as the probable future increase in per capita production for St. Bernard, Jefferson Eastbank, and Jefferson Westbank over the next twenty years. Based on this factor Table VI-4 has been prepared showing the estimated per capita production by each of these communities at five-year intervals to 1990. These figures generally indicate that the future per capita production of these various communities will be well under the 6.4 lbs. per capita as forecast by APWA as the national average by 1990.

TABLE VI-4
FORECAST OF WASTE PRODUCTION TO 1990
(7-Day Week)

	1970		1975		1980		1985		1990	
	Lbs/Cap	Tons/Day	Lbs/Cap	Tons/Day	Lbs/Cap	Tons/Day	Lbs/Cap	Tons/Day	Lbs/Cap	Tons/Day
St. Bernard	3.45	91	3.70	117	3.95	152	4.20	189	4.55	236
Jefferson Westbank										
Gretna	3.15	53	3.35	60	3.60	68	3.85	79	4.15	92
Westwego	4.50	34	4.80	38	5.15	44	5.50	50	5.90	56
Uninc. Area	4.55	155	4.90	220	5.25	318	5.60	460	6.00	725
Jefferson Eastbank										
Kenner	2.80	60	3.00	75	3.25	117	3.40	166	3.70	222
Harahan	3.15	27	3.35	36	3.60	47	3.85	62	4.15	83
Uninc. Area	3.45	328	3.70	460	3.95	615	4.25	805	4.55	1,050

E. First Stage Refuse Disposal Program 1970-1980

An immediate need for programming additional disposal facilities in both Jefferson and St. Bernard Parishes is necessary to accommodate forecast quantities during the 1970-1980 decade. A principal objective in the first stage of the proposed Tri-Parish development program is to prohibit open burning and dumping. To accomplish this objective the capacities of incinerators must be enlarged or sanitary landfills established. The following text covers Recommended Programs for each Parish and community.

1. Jefferson Parish

The effective capacity of the David Drive Incinerator can be assumed at about 365 tons per day. Operating at this capacity it will be capable of handling approximately 75% of all wastes generated in the Eastbank area in 1970. An incineration deficiency of about 115 tons per day will exist in 1970; 300 tons per day in 1975; and 545 tons per day by 1980. To meet this deficiency, an incinerator installation with an initial capacity of 600 tons per day should be programmed in the eastern portion of the Parish in the vicinity of Airline Highway and Labarre Street to be in operation by 1975. To accomplish this, construction should be started by 1973. Based on present costs (1967), such an incinerator with adequate air pollution control would cost approximately $4,000,000 exclusive of land. An additional plant to serve the western portion of the Eastbank unincorporated area and Kenner should be programmed for construction in the mid-80's with an initial capacity of 400 tons per day. Such an incinerator should be ready for operation by 1985 and is estimated to cost approximately $3,000,000 exclusive of land.

Combined wastes generated by the communities of the Jefferson Westbank area are estimated to be 280 tons per day by 1970; 370 tons per day by 1975; and 500 tons per day by 1980. Expansion of the New Orleans Algiers incinerator to a capacity of 500 tons per day by 1975 would accommodate those wastes generated by the City of Gretna and the adjacent unincorporated area through 1980. Such an addition with plant modifications required would cost approximately $2,250,000. If a charge of $4.00 per ton were made by the City of New Orleans for this service, the cost to the City of Gretna and the Unincorporated area would be somewhat less than the present cost of incineration. Such a charge would fairly allocate the cost between the users of the facility.

A new incinerator proposed at the location of the existing Marrero plant with an initial capacity of 500 tons per day should be programmed for construction immediately to serve the balance of the Unincorporated area and the City of Westwego. Such a plant, based on present conditions (1967), would cost approximately $3,500,000 including air pollution control equipment. The site of the present plant is adequate and can be utilized for the new facility. This capacity would be adequate through 1985. These two plant locations are so situated to provide reasonable haul distances in the areas they serve.

2. St. Bernard Parish

Our estimates of the quantities of combustible refuse produced today in St. Bernard Parish indicate that the existing Parish incinerator has little reserve capacity beyond existing requirements for disposal of all combustible wastes presently generated in the area. In order to meet the demand for satisfactory disposal of all combustible (incinerable) wastes generated in this developing area of St. Bernard for the period 1970-1980, doubling its capacity or establishing a sanitary landfill operation is necessary.

The probable cost of operating the present 100-ton per day unit at full effective capacity (24 hours/day and 6 days/week) can be expected to be in the neighborhood of $8.00 per ton including amortization (25-year period) of the plant investment. Similarly, if this plant were to be doubled in capacity and the quantities of wastes delivered correspondingly increased, the cost per ton might be expected to drop to about $6.00 per ton.

Disposal of wastes by modern incineration methods is generally relatively expensive in communities the size of St. Bernard Parish, due to the limited quantities of wastes generated in the area and the correspondingly small capacity of the required plant.

Based upon our analysis of quantities presently generated in the area and the projections of waste through 1990, it is not likely that disposal by incineration will be economical until after 1980, at which time the Parish should consider participation in the provision of larger incineration capable of meeting the future needs of this Parish as well as other portions of the Tri-Parish area. Further detail of the future Tri-Parish program is covered in Chapter VII.

As an alternate means of disposal in the interim years until 1980, St. Bernard Parish should consider sanitary landfill methods for its requirements beyond the capacity of the present incinerator. Locations for sanitary landfill would be desirable in the same general area where the present open dump is operated on Paris Road. This area is presently removed from urban development, in an area of future industrial use and is reasonably close to the growth area. Based upon average annual quantities of wastes for the 1970-1980 period, about 10 acres per year would be required. Such a landfill could receive refuse generated in excess of the incinerator capacity until 1980, and will provide a convenient point of disposal for incinerator residue. In connection with the landfill and future expansion of the incinerator program, it is recommended that St. Bernard provide a small transfer station in the vicinity of Poydras, some eight miles to the southeast, when growth warrants its development.

It is estimated that costs of disposal during this interim period (1970 to 1980) would average about $5.50 per ton, that is, about $8.00 per ton by incineration and about $4.50 per ton by sanitary landfill methods, with costs allowed for transfer of wastes from the southeasterly developed areas. Based upon the long range program designed to serve the Tri-Parish area, considerable economy, through reduced disposal costs, would be immediately available in 1980 to St. Bernard Parish.

VII MASTER PLAN FOR TRI-PARISH AREA

A. General

The Tri-Parish area, which includes the parishes of Orleans, Jefferson, and St. Bernard, generally covers the New Orleans metropolitan area and for the purpose of this study is limited to the developed and populated portions of these three parishes. It covers an area of approximately 163 square miles, of which Orleans Parish occupies 66 square miles, Jefferson Parish 43 square miles on the east bank of the Mississippi and another 43 on the west bank, while the area under consideration in the St. Bernard Parish accounts for approximately 11 square miles

In previous chapters we have described these areas in detail; we have discussed the economic factors upon which the growth of the area depends and the relative rate of growth of one parish to the other. We have analyzed the various sources and rates of waste production, the types and characteristics of the waste, and the present means of disposal. We have discussed the inadequacies of the present waste disposal facilities and the steps required to bring them up to present day standards.

This is an area of dynamic growth, in which the presently estimated population of 1,073,000 is expected to increase to 1,131,000 by 1970; 1,489,000 by 1980; and 1,966,000 by 1990, or an increase of nearly 100% in the next 22 years. At the same time, the per capita rate of refuse production is expected to increase by 15% per decade.

In terms of refuse production, it is estimated that 2,280 tons per day of combustible refuse are currently generated within the area. It is anticipated that this quantity will increase to 3,675 by 1980 and to 5,700 tons per day by 1990 (6-day week), or nearly a 2-1/2 times increase over the present.

In Chapters V and VI we have discussed the first stage of development of a waste disposal program for each of the parishes covering the period from 1970 to 1980. In this Chapter it is our purpose to develop an overall master program of waste disposal for the entire developed Tri-Parish area adequate to the year 1990. We propose to integrate the waste disposal of the three parishes into a single whole and to present a solution without reference to parish or other political boundaries. Such solution must continue to utilize such existing facilities as may be economically incorporated into the overall program.

B. Characteristics of Future Development

Because of the relatively high cost of land development due to the need for filling and draining, and otherwise reclaiming of lands on which urban development can take place in the Tri-Parish area, it is anticipated that the future growth of the area will follow the already well established pattern of small lots and dense urban development. The estimated population densities in the planning studies for the Tri-Parish area upon which future population forecasts have been based further bear this out.

C. Proposed Methods of Refuse Disposal

Because of the relatively high density of developments and the relatively low elevations which have been established for urban development, there is little likelihood of being able to develop large sanitary landfill sites for general use within a reasonable haul distance from the developed areas. This matter was discussed in detail in Chapter IV together with other possible means of refuse disposal, all of which were discarded in favor of incineration. We have, therefore, for the most part, based the development of the master plan upon the use of incineration as a means of disposal of combustible wastes, limiting dumping to non-combustible materials and incinerator residue both of which can be used for the recovery of land either for public or commercial purposes without creating nuisance or health hazards in their vicinity.

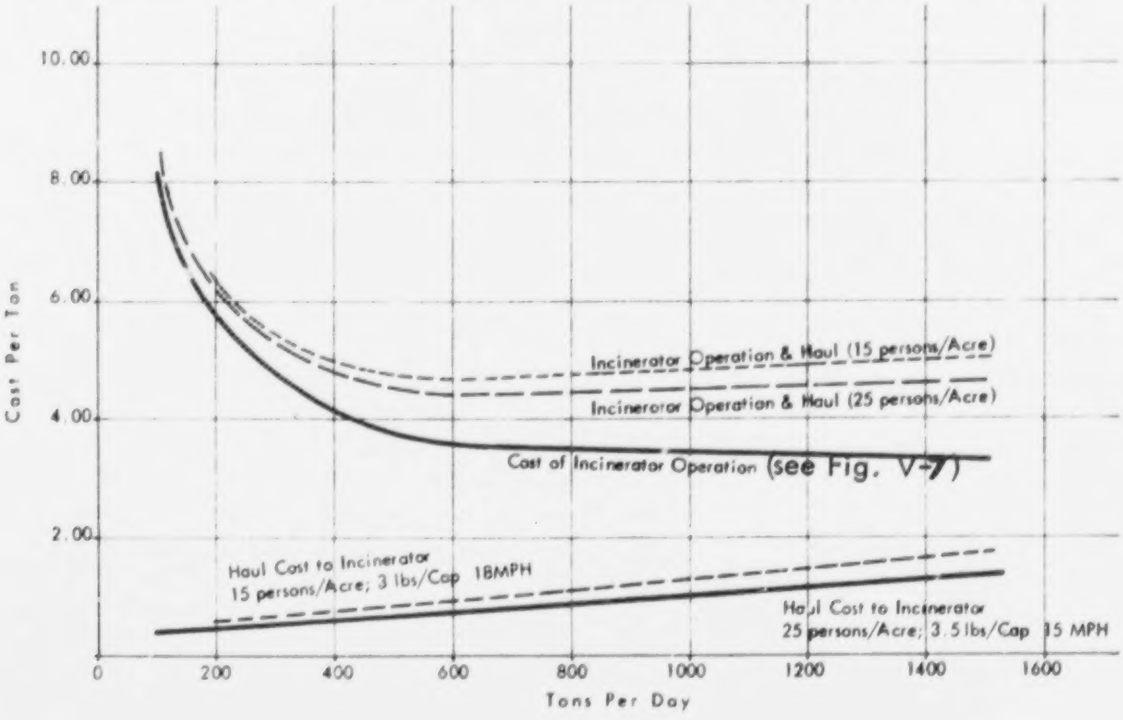
D. Economic Size of Incinerator

Before undertaking the development of the waste disposal plan for the Tri-Parish area, we made a study of the cost of constructing and operating modern incinerators of different capacities and the cost of hauling refuse from the pickup areas to the incinerators. Because of recent changes in market conditions, this study is based upon a construction cost of $6,250 per ton of incinerator with an annual interest of 5% and amortization with level debt service over 25 years, rather than the 3 1/2% interest and 20 year amortization used by the City in its records for the years 1965, 1966, and 1967 appearing in Table V-18. Wages are based on those currently paid by the Sanitation Department of the City of New Orleans.

The costs of utilities and residue disposal are also based on recent experience of the Sanitation Department in incinerator operation. Repairs have been assumed at 2% per annum of the entire cost of the plant. Plant operation has been based on 90% of the rated capacity (6-day week operation) and operating between 90 and 95% of the time, depending on the size of the incinerator and the number of furnaces available. The cost of haul to the incinerator has been based on the actual records for the use of 20-cubic yard packers currently used by the Sanitation Department with an estimated average load of four tons.

Studies have been made on collection areas having a density of 25 persons per acre and a waste production of 3.5 lbs. per capita with truck travel speed from the collection area to the incinerator of 15 miles per hour and also, on collection areas having a density of 15 persons per acre producing 3 lbs. per capita and haul speeds of 18 miles per hour from the collection area to the incinerator. In the development of the study it has been assumed that the incinerator is located in the center of a waste production area which is square in shape. Variation in the shape of the waste production area as well as in the relationship between area and incinerator would somewhat increase the haul cost from those shown under these ideal conditions. However, the cost would increase proportionately and the validity of the conclusions would not be altered. This information has been plotted on Figure VII-1. A study of this figure will reveal that the minimum cost of incinerator operation plus haul to the incinerator corresponds to an incinerator having a capacity of 600 tons per day. The cost per ton increases sharply for the smaller incinerators, increasing more gradually as the size of the incinerator also increases. This criteria holds true regardless of the density of population of the tributary area served.

FIGURE VII-1
ECONOMIC SIZE OF INCINERATOR - COST OF OPERATION AND HAUL



E. Proposed Master Development Program

1. Orleans Parish - General

In Table V-45 in Chapter V we presented a schedule of proposed incinerator utilization based on the first stage of development recommended in that Chapter for the City of New Orleans and covering the years from 1975 thru 1990. This schedule showed that, whereas all of the incinerators had adequate capacity to meet the requirements of 1980, substantial additional capacity was needed to meet the requirements of 1990.

a. Algiers District

The estimated waste production within the Algiers collection district (within Orleans Parish) is 346 tons per day by 1990 or 46 tons in excess of the 300-ton capacity provided thru the enlargement of the Algiers incinerator required as a part of the first stage of development. Examining the location of the Algiers incinerator, we find that it is located on the westerly boundary of Orleans Parish, adjacent to the City of Gretna and to a substantially developed area in the unincorporated portion of Jefferson Parish, both of which could be economically served by it, provided that sufficient capacity were available. This has been previously mentioned under Jefferson Parish in Chapter VI.

If instead of the 200-ton addition to the Algiers incinerator proposed under the first stage development, provisions were made for ultimately increasing the capacity of this incinerator to 800 tons by adding two 300-ton furnaces. Such an arrangement would require that the first 300-ton furnace be constructed prior to 1975 and the second after 1980. This incinerator would then have adequate capacity to receive the wastes from the Algiers section of Orleans Parish, the City of Gretna, and the adjacent section of the unincorporated area of Jefferson Parish to 1985. After 1985, the second 300-ton furnace would be needed to provide enough capacity thru 1990.

The additional increase of the Algiers incinerator to provide service to Gretna and part of the unincorporated area of Jefferson Parish would result in a reduction in the cost per ton of waste processed at this plant from approximately $4.50 per ton, for the plant enlarged to provide for the City of New Orleans only, to approximately $4.00 per ton for serving the enlarged area.

This substantial savings would benefit the City of New Orleans as well as the City of Gretna which will pay less than the cost of using its present incinerator. Also, because of the proximity to the adjacent portion of the unincorporated area of Jefferson Parish, the overall cost of disposal at the Algiers incinerator should be less than that of hauling the refuse to the Marrero incinerator which is proposed to serve the main part of the westbank area of Jefferson Parish.

With the modification in the suggested program of the Algiers incinerator mentioned above, adequate capacities would be available with this incinerator to serve the Algiers district thru 1990 and it would not be necessary to transfer refuse from this plant to the Seventh Street incinerator as proposed under the first stage development, thus leaving additional capacity at the Seventh Street incinerator for further growth.

b. Western, Central, and Night Districts

Referring again to Table V-45, we note that by 1990 there will be a slight shortage of capacity at the St. Louis incinerator to serve the Western district whereas the Seventh Street incinerator serving the Central and Night districts still has a capacity in excess of the requirements of these collection areas. By extending the Central collection area east of Carrollton Avenue from Julia to Tulane, the loads on each of these incinerators would be more evenly balanced.

c. Eastern I District

In the case of the Florida Avenue incinerator serving the Eastern I district, we find that its full capacity will be reached in 1982 after which provisions must be made for the excess of waste produced from the district. If the area served by this incinerator were reduced by eliminating the area from the St. Bernard Parish line to France Road (just westerly of the Inner Harbor Navigation Canal) approximately 126 tons per day (based on 1990 estimates) would be removed from the district thus permitting this incinerator to have sufficient capacity to meet the requirements of the remaining area until 1990. The removal of this area from the Eastern I collection district would reduce the haul distance for refuse trucks within the district and thus reduce the cost of waste disposal at this plant. Since this district is adjacent to the developed areas of St. Bernard Parish, it would be logical to consider the waste disposal from both of these areas in a single facility.

d. Eastern II District

In Table V-45 it was shown that the New Orleans East Incinerator serving the Eastern II collection district would reach full capacity by 1980 and that a second disposal facility would be required after that time. The anticipated growth in the Eastern II collection district can be expected to be in an easterly direction from the presently developed area toward Paris Road. The subsequent development can be expected to continue along the lake and highways as these areas are drained, filled, and prepared for urban development. Therefore, the additional disposal facility should be located to the east of Paris Road. Since a 500 acre tract, reserved for public park development, is located in the vicinity of Blind Lagoon, relatively close to the Paris Road area, consideration should be given to the development of a sanitary landfill in this area, to be in operation by 1984 to receive refuse collected within the district in excess of the capacity of the present incinerator. Between 1980 and 1984 and at a decreasing rate thereafter until 1988, the proposed St. Bernard incinerator will have the excess capacity required to receive the average of waste produced in N.O.-Eastern II District. The use of this facility by New Orleans to the extent possible will reduce disposal costs to a minimum.

Since the area served would be in the vicinity of Paris Road, the haul distance would be considerably reduced from those shown in Chapter IV thus making this method of disposal more attractive even with the standards that must be observed in sanitary landfill development as previously discussed. This landfill should be continued in full operation until such time as the daily production of refuse will warrant the construction of a second incinerator. Such an incinerator should have an ultimate capacity of 600 tons provided by three 200-ton furnaces. Initial construction would provide for the construction of two furnaces having a total capacity of 400 tons with provisions for the addition of the third unit when needed. The first stage construction should be ready for use by 1989. A portion of the sanitary landfill area at Blind Lagoon should be reserved as the site for the future incinerator.

2. St. Bernard Parish

In Chapter VI it was proposed that St. Bernard Parish provide a new incinerator to replace the present incinerator and have it in operation by 1980. If such an incinerator were planned to have an ultimate capacity of 600 tons per day with three 200-ton furnaces, two of such units would meet the needs of the Parish until about 1995 after which the third unit would be required. The two units would provide a nominal capacity of 400 tons per day and are estimated to cost $3,000,000 inclusive of land based on 1967 costs. If the refuse from the easterly portion of the Eastern I district of Orleans Parish were to be disposed of with that of St. Bernard Parish, 400-ton capacity would be sufficient until 1990 after which the third unit bringing the plant to its full 600-ton capacity would be needed. The effect of combining the refuse from a portion of the Eastern I district of New Orleans with that generated within the Parish would be to reduce the operating cost of refuse disposal from about $6.00 per ton to approximately $4.00 per ton. Such an arrangement would permit the City of New Orleans to dispose of its waste at $4.00 per ton and at the same time defer the capital expense required for a new incinerator.

3. Jefferson Parish

a. Westbank

The Marrero incinerator proposed under the first stage of development in Chapter VI to serve the unincorporated area of the Westbank of Jefferson Parish lying to the west of the City of Gretna and including the City of Westwego will be adequate to meet the 1990 conditions if enlarged to its ultimate capacity of 750 tons. The increase from the initial 500 tons to 750 tons will be required between 1985 and 1990 depending on the rate of growth of the area.

b. Eastbank

The present David Drive incinerator will be adequate to serve the needs of the City of Harahan and a portion of the unincorporated area of the Eastbank of Jefferson Parish provided that the Jefferson Kenner and Jefferson Labarre Street incinerators proposed under the first stage of development in Chapter VI are enlarged to their ultimate capacity of 600 and 900 tons respectively. These three incinerators will have a combined capacity sufficient to serve the entire Eastbank of Jefferson Parish including both the Cities of Kenner and Harahan thru 1990.

F. Implementation of the Program

1. Estimated Capital Investment

The basic Master Plan Development Program is shown in Table VII-1 and locations of these plants are shown in Figure V-14 (backcover). Implementation of the proposed solid waste disposal program will require a total capital investment estimated at $36,200,000 (1967 price basis) over the twenty period as shown in Table VII-2.

TABLE VII-1

PROPOSED MASTER DEVELOPMENT PROGRAM

Incinerator	Area Served	1980 Population	1980 Lbs. Per Cap.	1980 Tons Per Day	1980 Incinerators No. & Size Furnaces	1980 Incinerators Average Capacity Tons/Day	1990 Population	1990 Lbs. Per Cap.	1990 Tons Per Day	1990 Incinerators No. & Size Furnaces	1990 Incinerators Average Capacity Tons/Day
Seventh Street	Central District	229,000	3.92	448			234,750	4.55	535		
	Night	47,250	6.87	162			51,750	7.88	204		
	(Add Western Tulane Julia area)						9,150		29		
		276,250		610	3 @ 300	820	295,650		768	3 @ 300	820
St. Louis	Western Deduct before 1990	127,750	5.35	342			132,750	6.21	418		
	Tulane Julia area						- 9,150		-29		
		127,750		342	2 @ 225	410	123,600		389	2 @ 225	410
Florida Avenue	Eastern I Deduct	203,000	5.35	543			212,250	6.30	669		
	France Road to St. Bernard Parish	38,000		-100			40,000	6.30	-126		
		165,000		443	2 @ 300	545	252,250		543	2 @ 300	545
St. Bernard	St. Bernard Add Eastern I	77,000	4.65	180			104,000	5.50	286		
	France Road to St. Bernard Parish	38,000	5.35	100			40,000		126		
		115,000		280	2 @ 200	365	144,000		412	3 @ 200	545
N. O. East #1	Eastern II	136,000	5.35	364	2 @ 200	365	195,000	6.29	615	2 @ 200	365
N. O. East #2				-365					-365		
		136,000		0	—	—	195,000		250	2 @ 200	365
Algiers	Algiers	79,000	5.30	210			110,000	6.78	346		
	Algiers - Gretna Unincorporated	22,000	6.15	68	1 @ 200		78,000	6.85	268	1 @ 200	
	Gretna	38,000	4.20	80	1 @ 300		44,000	4.85	106	2 @ 300	
		139,000		358	500	450	232,000		720	800	720
Jefferson, Marrero	Jefferson West Bank Unincorporated	103,000	6.15	314			164,000	6.85	561		
	Westwego	17,000	6.0	51			19,000	7.00	59		
		120,000		365	2 @ 250	450	183,000		620	3 @ 250	675
Jefferson David Drive	Jefferson East Bank Unincorporated	126,000	4.65	293			96,400	5.50	264		
	Harahan	26,500	4.25	57			40,000	5.00	100		
		152,500		350	2 @ 200	365	136,400		364	2 @ 200	365
Jefferson Kenner	Jefferson East Bank Unincorporated	72,500	3.80	138	Landfill and 7th Street Incin.		90,000	5.50	247		
	Kenner						120,000	4.50	270		
							210,000		517	3 @ 200	545
Jefferson Labarre Street	Jefferson East Bank Unincorporated	182,950	4.65	425			272,500	5.50	750		
		182,950		425	2 @ 300	545	272,500		750	3 @ 300	820
	TOTAL			3,675		4,315			5,700		6,175

TABLE VII-2
CHRONOLOGICAL PROGRAM OF CAPITAL INVESTMENT
Based on 1967 Costs

	Estimated Cost
1969	
Reconstruct and enlarge Florida Avenue Incinerator to 600 tons/day	$ 3,750,000
Construct new Marrero Incinerator to 500 tons/day	$ 3,500,000
1971	
Reconstruct and enlarge Seventh Street Incinerator to 900 tons/day	$ 5,600,000
1973	
Enlarge Algiers Incinerators to 500 tons/day	$ 2,250,000
Construct Jefferson Labarre Street Incinerator having 600 tons/day initial capacity	$ 4,000,000*
1978	
Construct St. Bernard Incinerator having 400 tons/day initial capacity	$ 3,000,000*
1983	
Enlarge Algiers Incinerator to 800 tons/day	$ 2,250,000
Enlarge Marrero Incinerator to 750 tons/day	$ 2,000,000
Construct Jefferson Kenner Incinerator having 400 tons/day initial capacity	$ 3,000,000*
1985	
Enlarge Jefferson Kenner Incinerator to 600 tons/day	$ 1,600,000
1987	
Construct New Orleans East Incinerator #2 - 400 tons/day	$ 3,000,000
1989	
Enlarge Jefferson Labarre Street Incinerator to 900 tons/day	$ 2,250,000
Total Investment - Twenty-Year Program	$36,200,000

*Plus land

2. Overall Effect on Cost of Disposal

Present disposal costs averaging about \$3.70 per ton, but ranging from \$0.45 per ton at the Algiers dump to \$6.91 per ton at the Algiers Incinerator, as experienced by the City of New Orleans in 1967, will level off to an estimated cost of \$3.50-\$4.00 as the program is developed. In effect, the City of New Orleans will not incur major unit cost increases with development of improved disposal facilities. Conversely, those communities including St. Bernard, Westwego and Kenner, served exclusively by open dumps will experience costs that will be two to three times their present unit costs of disposal, with the availability of improved standards of disposal. By and large none of the communities will experience a reduction in the average cost per ton for disposal, with the possible exception of the Unincorporated Eastbank Area of Jefferson Parish, which through full operation of the existing Eastbank Incinerator should lower unit costs substantially.

To emphasize the magnitued of this program, by 1980 the annual combined capacity of these plants would be about 1,400,000 tons with annual costs at about \$4,500,000 and by 1990 the expanded plants would have a combined annual capacity of over 1,800,000 tons with annual costs of some \$6,400,000. These compare with a 1967 annual incinerator capacity of 340,000 tons operated at a cost of \$1,500,000.

Table VII-3 was prepared showing each plant expansion in the program together with projections of anticipated annual costs over the twenty-year period. In Table VII-4 is shown the operation cost for the various sizes of incinerators for each of the collection districts and parishes used in the preparation of Table VII-3. (Backcover).

3. Central Management

A central Tri-Parish authority was suggested in Chapter IV for the control and regulation of solid waste disposal. With the adoption of a long range Tri-Parish disposal program and development of the proposed incinerator plants, it follows that central management of these plants should also be considered. With increasing complexity of modern disposal facilities it is imperative that plant operation and maintenance be closely managed, to assure maximum efficiency at minimum expense and a reasonable period of useful life.

Central management in operation and control of these facilities would be more effective in acquiring, training and utilizing all classifications of personnel. Similarly, with multi-plant operation, minimum parts and supplies inventories would be required and standardization of plant and equipment could be achieved where practicable. Total responsibility on management for operation and

TABLE VII-4

ESTIMATED VARIATIONS IN OPERATING COSTS
(Incinerators 100 Tons/Day - 900 Tons/Day)
(6 day basis - 3 shift operation)

RATED CAP. T/D	400	500	600	750	800	900	100
EFFECTIVE CAP. T/D	365	450	545	675	720	820	35
EFFECTIVE CAP. T/YR.	113,000	140,000	170,000	210,000	224,000	256,000	10,000 (1 shift only)
OPERATING EXPENSE							
LABOR & FRINGE BENEFITS	$ 150,000	$ 170,000	$ 186,000	$ 222,000	$ 234,000	$ 255,000	$ 30,000
Variable	1.32	1.22	1.096	1.06	1.04	1.00	
UTILITIES	20,000	25,000	30,000 .176/T	37,000	39,000	45,000	2,000
Constant Unit Cost							
MAINTENANCE & REPAIRS	40,000	50,000	60,000 .352/T	74,000	78,000	90,000	10,000
Constant Unit Cost							
RESIDUE REMOVAL	20,000	25,000	30,000 .176/T	37,000	39,000	45,000	2,000
Constant Unit Cost							
TOTAL	$ 230,000	$ 270,000	$ 306,000	$ 370,000	$ 390,000	$ 435,000	$ 44,000
Average Cost/Ton	2.02	1.93	1.80	1.75	1.75	1.70	4.40

maintenance of the plant facilities, without being charged with other unrelated functions would provide a foundation for an efficient and economical solid waste disposal program that could be operated by either public or private enterprise.

The full utilization of the tri-Parish disposal facilities for the disposal of waste generated within the tri-Parish area without limitation of parish boundaries results in an overall savings to the tri-Parish area of 10-15 percent with the savings to St. Bernard Parish and the Westbank Area of Jefferson Parish approaching 25 percent. Additional savings through a single tri-Parish administrative and operating organization could conceivably reduce these costs another 5-10 percent or an overall reduction in disposal cost through a single tri-Parish organization of about 20 percent.

In the opinion of the Assistant City Attorney of the City of New Orleans, the City may join with other parishes in the establishment of a tri-parish garbage disposal area. This opinion is based upon the following portions of Section 1324 of Title 33 of the Louisiana Revised Statutes of 1950:

> "Any parish, municipality, police jury, harbor and terminal district or any combination thereof may make agreements between or among themselves to engage jointly in the exercise of any power, the construction or acquisition or improvement of any public project or improvement, or the promotion and maintenance of any undertaking which each of the participating authorities may exercise or take individually under any provision of general or special law. Such arrangements may include but are not limited to activities concerning:
>
> ***************
>
> (3) Sewers, drains and garbage and other refuse collection and disposal; ****"

APPENDIX

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APPENDIX I Digest of Solid Waste Ordinances

Digests of the available Solid Waste Ordinances in the Tri-Parish Area have been included in the following:

I-A	City of New Orleans
I-B	Jefferson Parish
I-C	City of Kenner (Bid Specifications for contract collection)
I-D	City of Gretna
I-E	Solid Waste Disposal Regulations - State of Louisiana

I-A Digest of City of New Orleans Solid Waste Ordinance

Unlawful to keep, throw, deposit any refuse which is offensive to smell or injurious to health.

Unlawful to leave any airtight containers such as iceboxes, refrigerators, etc., which could be easily accessible to children without first removing either the door or the locks. 3/17/67

Unlawful to use garbage, refuse, or swill for purpose of filling lots.

Owners and occupants of all premises shall provide containers for storage which should be enough to hold one week's amount of trash and garbage.

Containers should be galvanized steel or any other material approved by Director of Sanitation, with handles and tight fitting covers, watertight - not less than 10 gallons and not more than 30 gallons, the cover is not to be attached in anyway to containers; combined weight of both garbage and trash is not to exceed 75 pounds.

Cans must be covered at all times and garbage wrapped in newspaper.

Trash containers and contents therein must not exceed 75 pounds, yet these containers may be made of wood or metal and need not have covers. Boxes are allowed for this purpose.

Branches and shrubbery must be cut in lengths of less than four feet and tied in bundles not to exceed three bundles and/or 75 pounds.

Time of collection is designated by Director of Sanitation - cans placed at curb or alley before 5 AM for day and between 5 and 6 PM for night must be removed immediately after pickup.

Not in excess of 60 gallons of garbage or three bundles of branches will be removed by department from any one household. Excessive amounts must be removed by occupants themselves.

Refusal to pickup garbage and trash may be made by Director of Sanitation when no compliance to type or quantity of refuse.

Contractor, manufacturers, and trading refuse is not accepted.

Contagious or infectious hospital waste must meet and be prepared for removal as indicated by Board of Health. All such boxes labeled "Hospital Waste".

Any flammable material must be placed in metal containers with cover and disposed of as stated by Director of Sanitation.

Unlawful to dispose of explosives by putting the same in garbage or trash containers.

Unlawful to put out refuse not properly separated or stored in containers or to keep refuse on premises if not properly stored or to remove covers other than placement or disturb cans of others.

Dumps facing road must be enclosed by fence not less than seven feet nor more than ten feet high having no advertisement on the fence.

Burning on private dumps prohibited. Those who maintain private dumps must take all necessary precautions to prevent fire by either persons or spontaneous combustion.

If fire does occur and New Orleans Fire Department (NOFD) is called upon to extinguish, the company or individual must pay for cost of personnel and equipment.

Cost plus accrued interest at rate of 6% annum will be charged to owner's tax bill.

If owner fails to pay full amount, a representative of NOFD shall have recorded in the Mortgage Office a sworn statement of cost; this recordation shall constitute a lien on the property until payment is made in full.

Resident of any premises must remove all sweepings of sidewalk so as not to allow this debris to stop up the drains.

Vehicle hauling wastes must be equipped with a tarpaulin in order to prevent spillage.

Removal of fire debris must be done within six days by residents.

Discharging of garbage from vessels into River is unlawful. Vessels discharging garbage to land in the Port of New Orleans must comply with container requirements.

Licences to collect garbage for the Port of New Orleans must be accepted by Board of Health.

The Police Department shall remove from streets abandoned, stripped junk cars placing a notice on them three days prior to removal and may be sold for junk after removal.

I-B Digest of Jefferson Parish Solid Waste Ordinance

All refuse accumulated in Jefferson Parish is collected, conveyed and disposed of by Parish. Private collectors must obtain operating permits from Director of Garbage and State Health Authorities. Open or stake body vehicles must be covered. This provision does not prohibit the actual producer or outside collectors to use Jefferson thoroughfare as long as both abide by above ordinance.

Director of garbage is authorized to regulate and schedule days of collection, type and locations of waste containers and other matters pertinent to this Division. He may modify or change same after notice as required by law.

Garbage and trash should be drained, bottles and cans rinsed and drained before disposing, tree trimmings and hedge clippings must not exceed 3" in diameter nor 4 feet in length, and tied in bundles not more than 2 feet thick. Trash which exceeds above limits and all non-combustible materials - building materials (brick, plaster, cement) will not be picked up and should be removed by occupants.

Occupants must supply and keep in good sanitary condition their own refuse containers. Occupants not meeting these standards will not be serviced. Containers are to be of galvanized steel or approved material with handles, tight fitting covers yet not secured to container, watertight and having a minimum 10 gallon to maximum 30 gallon capacity. Combined weight will not exceed 75 pounds.

Storing of refuse must be in approved containers unless express approval is granted by the Director, otherwise accumulation of refuse is prohibited. No persons shall place refuse in such a manner that scattering may occur due to elements.

Director designates days of collection in Areas of Parish. Occupants place approved containers at curb before 4:00 AM for collection days and removed promptly afterwards.

Collection of garbage and trash shall be collected not less than 3 times weekly. At any one collection, the occupant is limited to 60 gallons of refuse and three bundles of shrubbery and above this limit must be handled by occupant.

Charges for collection and disposal of refuse placed between sidewalk and curb for Garbage District I - 45 ¢ / month/dwelling unit; Garbage District II - 50 ¢ / month/dwelling unit. Service charges are collected bi-monthly on same billing of Waterworks of Jefferson Parish. An account will be considered delinquent if not paid 10 days after receipt. 30 days delinquency and the Director authorizes that all refuse collection for that account be halted. Services will resume on payment of accumulated fees plus 10%. Garbage disposal at Parish incinerator by commercial contract haulers or actual producer rate are set at $2.10/ton or fraction thereof which is charged rateable at $2.00/ton. Disposal of garbage or trash at Parish Dump or Landfill are rated to vehicles capacity:

Compaction vehicle 13-20 c.y.: 5.00/load
Compaction vehicle excess of 20 c.y.: 7.50/load
Vehicles such as open stake body or van type are charged .35 ¢ / 100 # / load.

Fees charged are collected by Director of Garbage in a manner within his discretion - provided at least one monthly by Finance Director to any Commercial Contract hauler. Penalties are equivalent for delinquent payments.

Any violator of Ordinance shall be guilty of a misdemeanor and upon conviction fined not more than $100.00 or imprisonment not more than 30 days in jail or both. Each day such violation is committed or permitted to continue shall constitute a separate offense.

I-C Digest of Kenner Bid Specification in lieu of Solid Waste Ordinance

Residential refuse collection will be combined of garbage and trash, three times weekly at the curb, not to exceed 15' from property line.

Not acceptable for trash collection will be ashes, construction debris, broken concrete, tree branches and wood in excess of 36' in length or debris from commercial and industrial establishments.

Refuse containers shall be metal or plastic, cylindrical shape, watertight, strong handles and tight fitting covers. Such containers shall be provided by occupant and maximum capacity must not exceed 30 gallons.

Collections shall be made on a weekly schedule by contractor who must submit (area scheduled for collection) within 45 days after city awards contract. Services shall not begin before 5:00 AM and be completed by 10:00 PM with no collections on Sunday. Contractor need not take more than three 30 gallon containers per dwelling unit. Any non-resident abides by above specifications.

All garbage and trash should be drained of all free liquids, with garbage either wrapped in paper or bagged. Separation of combustible and non-combustible is not required, but trash must be placed in containers or tied in bundles not to exceed three (3) feet in length. Loose trash will not be collected.

I-D Digest of Gretna Solid Waste Ordinance

It is unlawful to dump garbage, dead animals or fish and other refuse on public or private property whether enclosed or not, except on such grounds as designated by the City of Gretna for this purpose.

Violators will incur a fine not less than $2.50 not more than $25.00 or imprisonment for not less than 3 nor more than 30 days in jail or both.

Refuse containers must be galvanized iron with a tight cover not to exceed 30 gallons. Violators will be fined not more than $10.00 or imprisonment not more than 5 days.

It is unlawful to throw, place or deposit garbage, trash or other waste materials of any kind on public streets, highways, alleyways, public places and on private property whether enclosed by fence or not. Violators of above ordinance will be fined $100.00 or imprisonment not to exceed 30 days in jail or both.

I-E Solid Waste Disposal Regulations - State of Louisiana

10.50 DEFINITIONS

10.50.1 For the purpose of these regulations the following definitions shall apply:

REFUSE: Refuse includes garbage, rubbish, ashes, animal and vegetable waste from animal quarters, and all other waste matter, except sewage, from any public or private establishment, institution, or residence.

GARBAGE: Garbage includes all putrescible waste matter except sewage and recognizable industrial by-products. It includes putrescible vegetable matter, animal offal, and animal carcasses.

RUBBISH: Rubbish includes all non-putrescible waste matter, except ashes, from any public or private establishment, institution, or residence.

ASHES: Ashes includes the solid residue resulting from the combustion of all fuels used for heating, cooking, and the production of power in any public or private establishment, institution, or residence.

STABLE REFUSE: Stable refuse includes animal feces and urine, any material contaminated by animal body discharges, and waste feed stuff.

10.51 ACCUMULATION AND COLLECTION OF REFUSE

10.51.1 No owner or lessee of any public or private property or premise nor any agent of such owner or lessee shall permit garbage to accumulate upon the property or premise except in tightly covered containers constructed of such material and in such a manner as to be strong, watertight, not easily corroded, and rodent and insect-proof. When garbage and other types of refuse are collected separately, separate containers may be required by the State Health Officer or his duly authorized representative.

10.51.2 Refuse shall not be allowed to remain in any house or other building, cellar, or outhouse, or on any premise long enough to cause a nuisance or health hazard.

10.51.3 The bodies of vehicles used for the collection and transportation of garbage shall be watertight and easily cleaned. Such bodies shall be covered except when being loaded and unloaded.

10.51.4 No person shall throw or deposit or shall allow to fall upon any walkway, thoroughfare, or private property any refuse of any kind.

10.52 APPROVAL OF PLANS

10.52.1 No garbage or other refuse disposal plant or establishment shall be constructed unless plans for same have been approved by the State Board of Health.

10.53 DISPOSAL OF GARBAGE AND OTHER REFUSE

10.53.1 The disposal of garbage and other refuse shall be by a method or methods approved by the State Board of Health. The method or methods of disposal used shall include the maximum practicable insect, rodent, and nuisance control.

10.53.2 No place for the disposal of garbage or other refuse shall be maintained or operated except by permission of the duly authorized representative of the State Health Officer.

10.53.3 No refuse dump or place of deposit shall be maintained without provision for the prompt and proper disposal of the material deposited. Ultimate disposal shall be by incineration or burying so as to effectively prevent the breeding of flies and other insects, the breeding and harboring of rats and other rodents, and the creation of any other nuisance or health hazard.

10.53.4 Refuse shall not be deposited on or allowed to remain in any place from whence normal drainage might tend to contaminate any well, spring, cistern, or other source of potable water nor shall refuse be deposited on or allowed to remain in any place from whence drainage may cause the conveyance of any toxic, noxious, or offensive material onto any private premise.

10.53.5 The handling of refuse for salvage shall not be practiced except by permission of the duly authorized representative of the State Health Officer and then only under proper supervision.

10.54 SWINE FEEDING

10.54.1 No garbage shall be fed to swine without having first been heated throughout to a temperature of not less than 212° Farenheit and such temperature maintained throughout the mass for at least thirty minutes. Such heating shall be done in apparatus and by a method approved by the State Health Officer or his duly authorized representative.

10.55 DISPOSAL OF CARCASSES

10.55.1 Animal offal and the carcasses of animals shall be buried or cremated as directed by the State Health Officer or his duly authorized representative or shall be cooked (rendered) at a minimum temperature of 250° Farenheit, which temperature shall be maintained for at least thirty minutes. The apparatus and method or methods used in rendering shall be approved by a duly authorized representative of the State Health Officer, and rendering shall not be carried on in any establishment except under the provisions of a permit issued by such representative, as required in Chapter XX of this Code.

10.56 STABLE REFUSE

10.56.1 Every owner, lessee, manager (or other agent of an owner or lessee) of any stable, barn, stall, or any other establishment in the built-up part of any community, in which horses, cattle, dogs, fowls, or any other animals are quartered or in which stable refuse may accumulate shall cause such stable refuse to be promptly and properly removed therefrom, and shall at all times keep, or cause to be kept, such stable, barn, stall, or quarters, and the yards, drains, and appurtenances in a clean and sanitary condition, so that no offensive odors shall be allowed to escape therefrom. Manure shall be kept in covered containers, or shall be treated to prevent the breeding of flies.

10.56.2 It shall be the duty of every owner, lessee, manager (or other agent of an owner or lessee) of any stable, barn, stall, or other establishment used for quartering animals or fowls to cause all stable refuse to be removed daily from such stable, or stable premise, unless the refuse is pressed in bales, barrels or boxes. The removal and disposal of stable refuse without a written permit from the duly authorized representative of the State Health Officer is prohibited.

10.56.3 Vehicles used for the removal of stable refuse shall be loaded within the premise, and not upon the street or sidewalk.

10.56.4 No stable refuse vault or receptacle shall be built, or used, on any premise except pursuant to the terms of a permit granted therefor by the duly authorized representative of the State Health Officer.

APPENDIX II Haul Studies

Tables A-8 through A-37 which follow show the detailed analysis of refuse collection and haul by days and districts.

These tables are each divided into two parts, namely: "Present Operation" and "Future Operation." The information gathered in the survey is shown under "Present Operation." In each District, truck routes are numbered consecutively and are shown in the first column; the numbers shown, under the second column "Disposal Point", each represent a disposal location and are identified as follows:

1. Algiers Incinerator
2. Seventh Street Incinerator
3. Florida Avenue Incinerator
4. New Orleans East Incinerator
5. Algiers Dump
6. Gentilly Dump
7. St. Louis Incinerator

The next five columns including number of loads, tons collected, total haul mileage, minutes per day of collection and haul are obtained from the daily field survey data.

Minutes per ton collected is the collection time divided by tons collected, and average speed of travel is haul time divided by the total haul mileage.

Under "Future Operation", where no change in disposal point is proposed, additional time for collection is zero as are the additional tons (collected) per day and the number of trucks required to serve the area is 1.00. Where there is a change in the point of disposal (under future operation) adjusted haul miles have been scaled from the City map along the most probable route and the haul minutes computed using the average travel speed previously established, except in such cases where a different speed should obviously apply. Saving in haul time for the truck route has been considered as additional time for collection and has been posted under this heading.

Additional tons per day (collected) have been computed by dividing the additional collection time by the minutes per ton collected which result has been added to the observed tons collected and thus determine the total tons that could be collected under future operation.

The number of trucks required to serve the route has been determined by dividing the tons presently collected, by the calculated (future) tons that could be collected without increasing the work-day beyond that presently required. Summarizing the incremental trucks required to serve each route and subtracting this number from the trucks presently utilized indicates the savings in truck routes that could be realized by readjusting the collection areas within the district.

For additional information the reader is referred to pages V-64 and V-65 of the text.

Use of Computer

Planning and organization for the haul study providing for application of Data Processing initially required review of the end-product detail and desired format with supervisors in the City's Data Processing Division. Previous design of the route survey form (Form No. RS-1) provided for the acquisition of pertinent data from the field on an individual route basis. Processing and review of these daily route surveys required a summary of individual route activity i.e., number of loads, total tons collected, total haul and collection mileage, total haul and collection minutes, with posting of this detail to master summary sheets (Form RS-2) which provided total input for Data Processing handling. These summary sheets also included complete identification of each route by day group (days collected), day, week, route number, collection district, point of disposal, truck type and capacity. (Copies of Forms No. RS-1 and RS-2 enclosed in Appendix IV.)

This route information was converted by card punching to a form that Data Processing could then apply to the designed computer program. Simple formulas were provided to Data Processing for computer calculation of route speed (MPH), average tons per load, collection minutes per ton for the existing route conditions and adjusted time and distance characteristics where a change in the point of disposal is anticipared in future operations.

Tables A-8 through A-37 were prepared in similar format as the Data Processing print out except for manual computations of "Additional Time for Collection" and "Trucks Required to Serve Area".

The Data Processing Division was also requested to compile certain summaries to demonstrate types of information that could be compiled from the same input. Typical summaries included total daily and weekly collection activity of each district and tonnage records at each point of disposal.

TABLE A-8

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: CENTRAL   Collection Day: MONDAY   No. of Trucks per Day: 22

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
1	2	3	6.7	7	315	60	47.0	7.0	2	6	60	0	0	6.7	3	1.00
2	2	3	8.0	7	255	65	39.5	6.5	2	7	65	0	0	8.0	3	1.00
3	2	2	7.0	5	210	69	30.0	4.3	2	5	69	0	0	7.0	2	1.00
4	2	3	10.2	9	245	50	24.0	10.8	2	9	50	0	0	10.2	3	1.00
5	2	2	7.6	7	275	90	36.2	4.7	2	7	90	0	0	7.6	2	1.00
6	2	3	8.5	7	297	68	32.6	6.2	2	7	68	0	0	8.5	3	1.00
7	2	3	9.0	3	234	40	26.0	6.0	2	3	40	0	0	9.0	3	1.00
8	2	3	7.2	2	160	30	22.2	4.0	2	2	30	0	0	7.2	3	1.00
9	2	3	8.8	5	275	42	31.2	7.1	2	5	42	0	0	8.8	3	1.00
10	2	2	7	2	370	20	52.8	6.0	2	2	20	0	0	7.0	2	1.00
11	2	4	11.0	10	360	87	32.7	6.9	2	10	87	0	0	11.0	4	1.00
12	2	3	9.3	6	332	55	35.7	6.6	2	6	55	0	0	9.3	3	1.00
13*	2	3	9.0	9	190	80	21.1	6.8	7	9	80	0	0	9.0	3	1.00
14*	2	2	4.6	11	255	45	55.6	14.7	7	4	16	29	0.5	5.1	2	0.90
15*	2	2	7.6	9	285	85	37.5	6.4	7	1	9	76	2.0	9.6	2	0.79
16*	2	2	7.3	11	185	75	25.3	8.8	7	4	27	48	1.9	9.2	2	0.79
17*	2	3	6.0	18	220	80	36.6	13.6	7	8	35	45	1.2	7.2	3	0.83
18*	2	3	5.7	12	200	84	35.1	8.6	7	8	56	28	0.8	6.5	3	0.88
19*	2	3	6.9	15	270	110	39.1	8.2	7	6	44	66	1.7	8.6	3	0.80
20*	2	2	7.2	12	225	105	31.2	6.9	7	1	9	96	3.1	10.3	2	0.70
21*	2	2	6.0	7	248	47	41.3	8.9	7	5	34	13	0.3	6.3	2	0.95
22*	2	2	5.7	14	185	65	32.4	12.8	7	6	28	37	1.1	6.8	2	0.84
Total	-	58	166.3	188	5,591	1,452	-	-	-	121	1,014	438	12.6	178.9	58	20.48

* To be re-assigned to Western District

** (2) 7th Street Incinerator; (7) St. Louis Incinerator

TABLE A-9

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: WESTERN | Collection Day: MONDAY | No. of Trucks per Day: 28

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
1	7	3	7.3	12	370	90	51.0	8.0	7	12	90	0	0	7.3	3	1.00
2	1	3	8.2	51	295	175	36.0	17.5	7	30	103	72	2.0	10.2	3	0.80
3	1	2	7.4	23	205	65	27.7	21.2	7	5	14	51	1.8	9.2	2	0.80
4	1	2	6.3	22	175	95	27.8	13.8	7	9	39	56	2.0	8.3	2	0.76
5	7	2	7.5	8	250	50	33.3	9.6	7	8	50	0	0	7.5	2	1.00
6	7	2	6.4	9	205	55	32.0	9.8	7	9	55	0	0	6.4	2	1.00
7	5	2	7.6	51	215	160	28.3	19.1	7	20	63	97	3.4	11.0	2	0.69
8	5	2	7.0	29	225	150	32.1	11.6	7	10	52	98	3.1	10.1	2	0.69
9	5	2	6.8	32	265	145	39.0	13.2	7	6	27	118	3.0	9.8	2	0.69
10	7	2	6.8	6	240	48	35.3	7.5	7	6	48	0	0	6.8	2	1.00
11	7	2	5.9	5	170	45	26.8	6.7	7	5	45	0	0	5.9	2	1.00
12	7	2	6.2	5	205	50	33.0	6.0	7	5	50	0	0	6.2	2	1.00
13	7	2	5.6	5	100	55	17.8	5.5	7	5	55	0	0	5.6	2	1.00
14	5	2	8.2	18	185	160	22.6	6.7	7	8	108	52	2.3	10.5	3	0.78
15	7	2	6.2	9	205	55	33.0	9.8	7	9	55	0	0	6.2	2	1.00
16	1	2	6.7	42	272	120	40.6	21.0	7	14	40	80	2.0	8.7	2	0.77
17	7	2	7.6	15	255	50	33.5	18.0	7	15	50	0	0	7.6	2	1.00
18	7	2	8.7	13	285	80	32.7	9.8	7	13	80	0	0	8.7	2	1.00
19	7	3	9.1	24	345	95	38.0	15.1	7	24	95	0	0	9.1	3	1.00
20	7	2	7.6	8	215	115	28.3	4.2	7	8	115	0	0	7.6	2	1.00
21	7	2	7.4	14	170	60	24.9	14.0	7	14	60	0	0	7.4	2	1.00
22	5	2	8.1	47	360	180	44.4	15.6	7	16	62	118	2.7	10.8	2	0.75
23	7	2	6.4	18	165	75	25.8	14.4	7	18	75	0	0	6.4	2	1.00
24	7	2	7.1	24	170	100	23.9	14.4	7	24	100	0	0	7.1	2	1.00

Note: See following page for coding information

TABLE A-9 (Continued)

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: WESTERN   Collection Day: MONDAY   No. of Trucks per Day: 28

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
25	7	2	9.0	25	200	100	22.2	15.0	7	25	100	0	0	9.0	2	1.00
26	7	2	7.2	13	240	50	33.3	15.6	7	13	50	0	0	7.2	2	1.00
27	7	2	8.8	16	283	80	32.1	12.0	7	16	80	0	0	8.8	2	1.00
28	1	2	6.8	40	230	130	33.8	18.5	7	24	78	52	1.5	8.3	2	0.82
Total	-	59	203.9	584	6,500	2,633	-	-	-	371	1,839	794	23.8	227.7	60	25.55

** (1) Algiers Incinerator
(5) Algiers Dump
(7) St. Louis Incinerator

TABLE A-10

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: EASTERN I — Collection Day: MONDAY — No. of Trucks per Day: 22

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
1*	6	3	10.3	39	215	170	20.8	13.7	7	9	52	118	5.7	16.0	4	0.64
2*	6	2	9.7	22	240	150	24.8	8.8	7	5	51	99	4.0	13.7	3	0.71
3	6	2	9.5	35	280	150	29.4	14.0	3	5	31	119	4.1	13.6	3	0.70
4*	6	2	7.6	36	205	130	27.0	16.6	7	5	27	103	3.8	11.4	3	0.67
5	6	2	8.0	31	225	115	28.0	16.4	3	5	27	88	3.1	11.1	3	0.72
6	6	3	10.3	90	255	225	24.8	24.0	3	8	27	198	8.0	18.3	4	0.56
7*	3	3	8.5	8	305	95	36.0	7.0	7	11	130	- 35	-1.0	7.5	3	1.13
8	6	2	7.4	35	193	182	26.0	11.5	3	5	39	143	5.5	12.9	3	0.57
9	6	2	7.0	34	240	150	34.3	13.6	3	7	31	119	3.5	10.5	2	0.67
10	3	2	8.2	9	335	125	41.0	4.3	3	9	125	0	0	8.2	2	1.00
11	6	2	8.8	32	253	152	28.8	12.6	3	11	78	74	2.6	11.4	3	0.77
12	6	2	6.6	26	235	120	35.6	13.0	3	1	5	115	3.2	9.8	2	0.67
13	6	3	8.6	47	270	235	31.4	10.3	3	11	64	171	5.4	14.0	3	0.61
14	6	2	8.1	31	280	130	34.5	14.3	3	6	25	105	3.0	11.1	2	0.73
15	3	3	8.2	9	231	154	28.2	3.5	3	9	154	0	0	8.2	3	1.00
16	3	2	7.7	2	197	43	25.6	3.0	3	2	43	0	0	7.7	2	1.00
17	3	2	8.9	3	245	10	27.6	18.0	3	3	10	0	0	8.9	2	1.00
18	3	2	9.8	2	240	40	24.5	3.0	3	2	40	0	0	9.8	2	1.00
19	6	2	9.9	32	280	190	28.2	10.1	3	6	54	136	4.8	14.7	3	0.67
20	3	2	7.9	5	415	70	52.5	4.3	3	4	56	14	0.3	8.2	2	0.96
21	3	2	7.5	6	402	70	53.6	5.1	3	6	70	0	0	7.5	2	1.00
22	6	2	8.5	28	370	165	43.5	10.1	3	2	18	147	3.4	11.9	3	0.71
Total	-	49	187.0	562	5,911	2,871	-	-	-	132	1,157	1,714	59.4	246.4	59	17.49

* To be re-assigned to Western District

** (3) Florida Avenue Incinerator; (6) Gentilly Dump; (7) St. Louis Incinerator

TABLE A-11

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: EASTERN II   Collection Day: MONDAY   No. of Trucks per Day: 23

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. *to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
1	6	2	5.6	33	270	180	48.2	11.0	4	30	116	64	1.3	6.9	2	0.81
2	6	2	6.9	32	180	180	26.1	11.0	4	29	113	67	2.5	9.4	2	0.73
3	3	2	9.0	11	230	70	25.6	9.4	4	28	108	-38	-1.5	7.5	2	1.20
4	6	2	6.5	21	240	120	37.0	10.5	4	27	104	16	0.4	6.9	2	0.94
5	6	2	7.4	31	260	160	35.0	11.6	4	28	108	52	1.5	8.9	2	0.83
6	6	2	6.3	37	210	120	33.4	18.5	4	29	115	5	0.2	6.5	2	0.97
7	6	2	8.4	32	195	125	23.2	15.7	4	31	120	5	0.2	8.6	2	0.98
8*	6	2	9.1	31	445	130	49.0	14.3	3	7	43	87	1.8	10.9	3	0.83
9*	6	2	7.4	31	245	175	33.2	10.6	3	6	51	124	3.7	11.1	3	0.67
10*	3	2	6.0	7	175	55	29.2	7.6	3	7	55	0	0	6.0	2	1.00
11*	6	2	7.3	29	320	160	44.0	10.9	3	6	33	127	2.9	10.2	2	0.72
12*	6	2	8.2	26	370	110	45.0	14.2	3	6	25	85	1.9	10.1	2	0.81
13	6	2	6.8	34	240	185	35.2	11.0	4	24	93	92	2.6	9.4	2	0.72
14	6	2	6.3	34	175	140	27.8	14.5	4	27	104	36	1.3	7.6	2	0.83
15	6	2	7.5	35	300	150	40.0	14.0	4	26	102	48	1.2	8.7	2	0.86
16	6	2	5.6	28	190	130	34.0	12.9	4	25	97	33	1.0	6.6	2	0.85
17	6	2	6.3	35	310	170	49.0	12.3	4	33	128	42	0.9	7.2	2	0.88
18	3	2	7.6	12	155	65	20.4	11.0	4	33	128	-63	-3.1	4.5	2	1.70
19	6	2	5.9	32	198	162	33.5	11.8	4	29	113	49	1.5	7.4	2	0.80
20	6	2	5.1	33	250	140	49.0	14.1	4	30	116	24	0.5	5.6	2	0.91
21	6	3	9.9	53	285	270	28.8	11.8	4	43	166	104	3.6	13.5	3	0.73
22	6	2	6.7	24	230	140	34.4	10.3	4	32	124	16	0.5	7.2	2	0.93
23	3	2	7.7	8	170	50	22.0	9.6	4	30	116	-66	-3.0	4.7	2	1.60
Total	-	47	163.5	2,284	5,643	3,187	-	-	-	566	2,278	909	21.9	185.4	49	21.30

* To be re-assigned to Eastern I District

** (3) Florida Avenue Incinerator; (4) N. O. East Incinerator (6) Gentilly Dump

TABLE A-12

ANALYSIS OF REFUSE COLLECTION AND HAUL

Districts: ALGiERS and NIGHT　　Collection Day: MONDAY　　No. of Trucks per Day: 8

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec. (min.)	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.		Addit.	Total		
								ALGIERS								
1	1	2	8.2	5	325	46	39.6	6.5	1	5	46	0	0	8.2	2	1.00
2	5	2	8.3	8	375	48	45.0	10.0	1	8	48	0	0	8.3	2	1.00
3	5	2	6.0	14	285	60	47.5	14.0	1	12	51	9	0.2	6.2	2	0.97
4	5	3	12.7	18	440	84	34.6	12.8	1	18	84	0	0	12.7	3	1.00
5	5	2	8.4	12	390	52	46.5	13.8	1	12	52	0	0	8.4	2	1.00
6	5	2	5.1	20	310	180	60.8	6.7	1	12	108	72	1.2	6.3	2	0.81
7	5	2	8.9	20	250	100	28.0	12.0	1	16	80	20	0.7	9.6	2	0.93
8	1	2	8.2	10	175	80	21.3	7.5	1	10	80	0	0	8.2	2	1.00
Total	-	17	65.8	107	2,550	650	-	-	-	93	549	101	2.1	67.9	17	7.71
								NIGHT								
1	2	3	8.7	17	240	80	27.6	12.7	2	17	80	0	0	8.7	3	1.00
2	2	3	9.5	15	255	90	26.8	10.0	2	15	90	0	0	9.5	3	1.00
3	2	2	6.6	13	197	58	29.8	13.4	2	13	58	0	0	6.6	2	1.00
4	2	3	9.0	11	257	43	28.5	15.3	2	11	43	0	0	9.0	3	1.00
5	2	3	7.5	10	195	45	26.0	12.5	2	10	45	0	0	7.5	3	1.00
6	2	2	6.4	7	251	34	39.2	12.3	2	7	34	0	0	6.4	2	1.00
7	2	3	8.2	15	230	95	28.0	9.5	2	15	95	0	0	8.2	3	1.00
8	2	3	8.9	11	335	70	37.7	9.4	2	11	70	0	0	8.9	3	1.00
Total	-	22	64.8	99	1,960	515	-	-	-	99	515	0	0	64.8	22	8.00

** (1) Algiers Incinerator; (2) 7th Street Incinerator; (5) Algiers Dump

TABLE A-13

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: CENTRAL　Collection Day: TUESDAY　No. of Trucks per Day: 22

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
1	2	3	7.5	18	245	115	32.7	9.4	2	18	115	0	0	7.5	3	1.00
2	2	3	7.8	12	215	100	27.6	7.2	2	12	100	0	0	7.8	3	1.00
3	2	3	8.3	15	265	85	32.0	10.6	2	15	85	0	0	8.3	3	1.00
4	2	3	8.3	13	165	55	19.9	14.2	2	13	55	0	0	8.3	3	1.00
5	2	4	9.3	16	235	130	25.3	7.4	2	16	130	0	0	9.3	4	1.00
6	2	2	7.7	6	220	30	28.6	12.0	2	6	30	0	0	7.7	2	1.00
7	2	4	11.3	14	283	61	25.0	13.8	2	14	61	0	0	11.3	4	1.00
8	2	3	7.2	17	245	85	34.0	12.0	2	17	85	0	0	7.2	3	1.00
9	2	3	8.5	9	380	75	44.7	7.2	2	9	75	0	0	8.5	3	1.00
10	2	3	7.2	7	345	55	47.9	7.6	2	7	55	0	0	7.2	3	1.00
11	2	4	10.9	8	385	90	35.5	5.3	2	8	90	0	0	10.9	4	1.00
12	2	3	9.8	8	290	40	29.6	12.0	2	8	40	0	0	9.8	3	1.00
13	2	3	9.2	6	283	42	30.8	8.6	2	6	42	0	0	9.2	3	1.00
14	2	4	9.4	6	305	75	32.4	4.8	2	6	75	0	0	9.4	4	1.00
15	2	3	7.9	2	295	25	37.3	4.8	2	2	25	0	0	7.9	3	1.00
16	2	3	11.3	3	230	25	20.3	7.2	2	3	25	0	0	11.3	3	1.00
17	2	4	9.8	4	339	81	34.6	3.0	2	4	81	0	0	9.8	4	1.00
18	2	4	13.3	10	258	82	19.5	7.3	2	10	82	0	0	13.3	4	1.00
19	2	3	6.7	8	265	85	39.5	5.7	2	8	85	0	0	6.7	3	1.00
20	2	3	9.4	7	290	35	30.9	12.0	2	7	35	0	0	9.4	3	1.00
21	2	3	7.6	6	290	55	38.1	6.5	2	6	55	0	0	7.6	3	1.00
22	2	4	9.5	13	293	107	30.8	7.3	2	13	107	0	0	9.5	4	1.00
Total	-	72	197.9	208	6,121	1,533	-	-	-	208	1,533	0	0	197.9	72	22.00

** (2) 7th Street Incinerator

TABLE A-14

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: WESTERN Collection Day: TUESDAY No. of Trucks per Day: 28

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec. (min.)	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.		Addit.	Total		
1*	7	2	6.9	20	235	85	34.1	14.1	2	12	51	34	1	7.9	2	0.87
2*	1	2	7.0	31	215	115	45.0	16.2	2	11	41	74	1.6	8.6	2	0.81
3*	1	2	7.8	24	245	115	31.4	12.6	2	10	48	67	2.1	9.9	2	0.79
4*	7	2	7.0	21	235	80	33.6	15.8	2	8	30	50	1.4	8.4	2	0.83
5*	7	2	6.9	16	210	80	30.4	12.0	2	7	35	45	1.4	8.3	2	0.83
6*	1	2	7.7	26	295	145	38.2	10.8	2	8	44	101	2.6	10.3	2	0.75
7*	1	2	8.8	36	222	123	25.2	17.6	2	10	51	72	2.9	11.7	3	0.75
8*	7	2	7.8	17	255	63	32.7	16.2	2	5	19	44	1.3	9.1	2	0.86
9*	1	2	7.1	33	240	120	33.8	16.5	2	9	33	87	2.5	9.6	2	0.74
10*	7	2	6.1	12	230	85	37.7	8.5	2	8	56	29	0.8	6.9	2	0.88
11*	7	2	8.1	16	215	80	32.1	12.0	2	10	50	30	0.9	9.0	2	0.90
12*	7	2	7.9	15	225	85	28.5	10.6	2	10	57	28	1	8.9	2	0.88
13*	7	2	8.3	12	280	50	33.7	14.4	2	7	29	21	0.6	8.9	2	0.93
14*	1	2	7.1	28	245	95	34.5	17.6	2	9	31	64	1.8	8.9	2	0.80
15	7	2	8.7	14	255	85	29.5	9.8	7	14	85	0	0	8.7	2	1.00
16	1	2	8.9	30	330	97	37.1	18.6	7	13	42	55	1.4	10.3	2	0.86
17	7	2	8.0	14	255	95	31.9	8.8	7	14	95	0	0	8.0	2	1.00
18	7	2	9.3	15	160	80	17.2	11.2	7	15	80	0	0	9.3	2	1.00
19*	1	2	7.5	32	260	100	34.6	19.2	2	13	41	59	1.7	9.2	2	0.82
20	1	2	10.4	28	245	115	23.5	14.6	7	12	74	42	1.8	12.2	3	0.85
21*	7	2	9.6	18	210	80	22.0	13.6	2	12	53	27	1.2	10.8	2	0.88
22	1	3	9.9	35	305	130	30.8	16.2	7	18	67	63	2.0	11.9	3	0.83
23	7	2	7.0	10	200	55	28.6	10.9	7	10	55	0	0	7.0	2	1.00
24	7	2	7.6	12	210	70	27.6	10.3	7	12	70	0	0	7.6	2	1.00

Note: See following page for coding information

TABLE A-14 (Continued)

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: WESTERN | Collection Day: TUESDAY | No. of Trucks per Day: 28

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec. (min.)	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.		Addit.	Total		
25*	7	2	5.6	11	255	65	45.5	10.1	2	9	54	11	0.2	5.8	2	0.97
26	1	2	7.7	15	245	55	31.8	16.3	7	11	41	14	0.4	8.1	2	0.95
27*	7	2	7.2	12	260	60	36.1	12.0	2	10	50	10	0.3	7.5	2	0.96
28	7	2	7.4	12	185	55	25.0	13.1	7	12	55	0	0	7.4	2	1.00
Total	-	57	219.3	565	6,722	2,463	-	-	-	299	1,437	1,027	30.9	250.2	59	24.74

* To be re-assigned to Central District

** (1) Algiers Incinerator

(2) 7th Street Incinerator

(7) St. Louis Incinerator

TABLE A-15

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: EASTERN I | Collection Day: TUESDAY | No. of Trucks per Day: 22

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
1*	3	3	14.2	12	290	90	20.4	8.0	7	12	90	0	0	14.2	3	1.00
2	3	2	12.5	7	275	55	22.0	7.6	3	7	55	0	0	12.5	2	1.00
3*	3	2	9.4	7	352	48	37.4	8.7	7	10	69	-21	-0.6	8.8	2	1.07
4	3	3	12.8	8	245	60	11.3	8.0	3	8	60	0	0	12.8	3	1.00
5	3	3	11.8	7	240	60	11.0	7.0	3	7	60	0	0	11.8	3	1.00
6	3	2	11.4	7	270	65	23.7	6.5	3	4	37	28	1.2	12.6	2	0.91
7*	3	2	9.1	12	370	50	40.7	14.4	7	12	50	0	0	9.1	2	1.00
8*	3	2	11.3	9	255	46	22.6	11.7	7	9	46	0	0	11.3	2	1.00
9	3	2	11.2	12	265	60	23.7	12.0	3	12	60	0	0	11.2	2	1.00
10	3	3	12.4	15	470	115	38.0	7.8	3	15	115	0	0	12.4	3	1.00
11	3	2	11.6	8	275	55	23.7	8.7	3	8	55	0	0	11.6	2	1.00
12	3	2	9.7	14	300	90	30.9	9.3	3	14	90	0	0	9.7	2	1.00
13	3	3	9.7	24	340	75	35.0	19.2	3	24	75	0	0	9.7	3	1.00
14	3	2	9.3	13	220	70	23.7	11.1	3	13	70	0	0	9.3	2	1.00
15	3	3	8.5	23	335	115	39.4	12.0	3	23	115	0	0	8.5	3	1.00
16	3	2	7.7	14	310	80	40.3	10.5	3	14	80	0	0	7.7	2	1.00
17	3	2	10.7	14	360	106	33.6	7.9	3	14	106	0	0	10.7	2	1.00
18	3	2	8.9	14	290	85	32.6	9.8	3	14	85	0	0	8.9	2	1.00
19	6	2	9.4	24	155	143	16.5	10.2	3	13	76	9	0.6	10.0	2	0.94
20	3	2	9.2	15	340	85	35.0	10.6	3	15	85	0	0	9.7	2	1.00
21	3	3	9.9	20	165	135	16.7	8.9	3	20	135	0	0	9.9	3	1.00
22	3	2	9.7	10	265	72	27.3	8.3	3	10	72	0	0	9.7	2	1.00
Total	-	51	230.9	289	6,387	1,760	-	-	-	278	1,686	16	1.2	232.1	51	21.92

* To be re-assigned to Western District

** (3) Florida Avenue Incinerator; (7) St. Louis Incinerator

TABLE A-16

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: EASTERN II | Collection Day: TUESDAY | No. of Trucks per Day: 23

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec. (min.)	Tons/Day		No. of Loads	Trucks Req'd. to* Serve Area
					Collec.	Haul				Miles	Min.		Addit.	Total		
1	3	2	8.7	16	420	80	48.3	12.0	4	12	60	20	0.4	9.1	2	0.96
2	6	2	8.7	19	220	95	25.3	12.0	4	10	50	45	1.7	10.4	2	0.84
3	6	2	9.5	17	215	115	22.6	8.9	4	8	81	34	1.5	11.0	3	0.86
4	6	2	8.8	21	175	125	20.0	10.2	4	14	82	43	2.1	10.9	2	0.80
5	6	2	10.1	25	210	162	20.8	9.2	4	17	110	52	2.5	12.6	2	0.80
6	3	2	9.9	17	190	78	19.2	13.0	4	20	92	-14	-0.7	9.2	2	1.08
7*	6	2	10.2	29	195	105	19.1	16.5	3	6	33	72	3.8	14.0	3	0.73
8*	6	2	8.8	35	215	145	24.4	14.5	3	4	25	120	4.9	13.7	3	0.64
9*	6	2	9.7	26	244	161	25.1	9.7	3	8	73	88	3.5	13.2	3	0.73
10*	3	2	6.5	8	194	50	29.9	9.6	3	6	38	12	0.4	6.9	2	0.94
11	6	2	7.9	26	370	100	47.0	15.6	4	26	130	0	0	7.9	2	1.00
12*	3	2	7.5	7	345	65	46.0	6.5	3	7	65	0	0	7.5	2	1.00
13	6	2	9.1	26	305	150	33.5	10.4	4	22	127	23	0.7	9.8	2	0.93
14	6	2	10.3	24	175	95	17.0	15.1	4	24	95	0	0	10.3	2	1.00
15	6	2	7.3	29	345	100	47.2	17.4	4	24	83	17	0.3	7.6	2	0.96
16	6	2	10.9	30	190	110	17.4	16.3	4	26	96	14	0.8	11.7	2	0.93
17	3	4	14.3	44	450	195	31.5	13.6	4	12	53	137	4.3	18.6	4	0.77
18	5	2	10.2	16	193	82	18.9	11.7	4	4	31	51	2.7	12.9	3	0.79
19	6	2	11.7	11	265	95	22.7	6.9	4	2	25	70	3.1	14.8	3	0.79
20	6	2	9.7	16	396	130	40.8	7.4	4	2	24	106	2.6	12.3	3	0.79
21	6	2	11.4	21	195	130	17.1	9.6	4	6	57	73	4.3	15.7	3	0.73
22	3	3	11.8	45	365	146	30.9	18.5	4	21	68	78	2.5	14.3	3	0.83
23	6	2	8.7	30	350	114	40.2	15.8	4	18	68	46	1.1	9.8	2	0.89
Total	-	49	221.7	538	6,222	2,628	-	-	-	299	1,536	1,087	42.5	264.2	57	19.79

* To be re-assigned to Eastern I District

** (3) Florida Ave. Incinerator; (4) N. O. East Incin.; (5) Algiers Dump; (6) Gentilly Dump

TABLE A-17

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: ALGIERS and NIGHT   Collection Day: TUESDAY   No. of Trucks per Day: 8

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec. (min.)	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.		Addit.	Total		
								A L G I E R S								
1	1	2	7.9	10	220	40	27.8	15.0	1	10	40	0	0	7.9	2	1.00
2	1	2	6.3	8	205	50	39.5	9.6	1	8	50	0	0	6.3	2	1.00
3	1	2	7.1	5	215	35	30.3	8.6	1	5	35	0	0	7.1	2	1.00
4	1	2	6.2	6	205	47	33.0	7.7	1	6	47	0	0	6.2	2	1.00
5	1	2	6.3	5	165	60	26.2	5.0	1	5	60	0	0	6.3	2	1.00
6	1	3	8.9	8	280	45	31.5	10.7	1	8	45	0	0	8.9	3	1.00
7	1	2	8.2	6	326	40	39.7	9.0	1	6	40	0	0	8.2	2	1.00
8	1	2	9.7	6	370	35	38.1	10.3	1	6	35	0	0	9.7	2	1.00
Total	-	17	60.6	54	1,986	352	-	-	-	54	352	0	0	60.6	17	8.00
								N I G H T								
1	2	2	8.4	11	250	50	29.8	13.2	2	11	50	0	0	8.4	2	1.00
2	2	2	8.4	12	205	50	24.4	14.4	2	12	50	0	0	8.4	2	1.00
3	2	3	9.8	19	245	85	25.0	13.4	2	19	85	0	0	9.8	3	1.00
4	2	3	10.1	6	280	39	27.7	9.2	2	6	39	0	0	10.1	3	1.00
5	2	3	10.2	9	195	45	19.1	12.0	2	9	45	0	0	10.2	3	1.00
6	2	2	7.5	10	125	87	16.7	6.9	2	10	87	0	0	7.5	2	1.00
7	2	3	10.4	16	235	100	22.6	9.6	2	16	100	0	0	10.4	3	1.00
8	2	3	9.0	7	252	88	28.0	4.8	2	7	88	0	0	9.0	3	1.00
Total	-	21	73.8	90	1,787	544	-	-	-	90	544	0	0	73.8	21	8.00

** (1) Algiers Incinerator; (2) 7th Street Incinerator

TABLE A-18

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: CENTRAL   Collection Day: WEDNESDAY   No. of Trucks per Day: 22

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
1	2	3	7.0	6	225	45	32.2	8.0	2	6	45	0	0	7.0	3	1.00
2	2	2	5.5	5	150	20	27.2	15.0	2	5	20	0	0	5.5	2	1.00
3	2	2	5.0	5	200	30	40.0	10.0	2	5	30	0	0	5.0	2	1.00
4	2	2	7.6	6	165	35	21.7	10.3	2	6	35	0	0	7.6	2	1.00
5	2	3	5.8	10	215	45	37.0	13.3	2	10	45	0	0	5.8	3	1.00
6	2	2	6.3	4	211	26	33.5	9.3	2	4	26	0	0	6.3	2	1.00
7	2	2	5.4	2	263	12	48.8	10.0	2	2	12	0	0	5.4	2	1.00
8	2	2	5.1	1	240	45	47.0	-	2	1	45	0	0	5.1	2	1.00
9	2	2	6.6	3	270	31	41.0	6.0	2	3	31	0	0	6.6	2	1.00
10	2	2	5.8	2	295	35	51.0	3.4	2	2	35	0	0	5.8	2	1.00
11	2	3	8.5	8	277	48	32.6	10.0	2	8	48	0	0	8.5	3	1.00
12	2	2	7.0	4	290	40	41.5	6.0	2	4	40	0	0	7.0	2	1.00
13*	2	2	5.5	6	150	90	27.3	4.0	7	6	90	0	0	5.5	2	1.00
14*	2	2	4.9	11	180	75	36.7	9.0	7	4	27	48	1.3	6.2	2	0.79
15*	2	2	5.0	9	225	55	45.0	10.0	7	1	6	49	1.1	6.1	2	0.82
16*	2	2	5.4	11	120	63	22.2	10.5	7	4	23	40	1.8	7.2	2	0.75
17*	2	2	4.4	12	135	58	30.7	12.4	7	5	24	34	1.1	5.5	2	0.80
18*	2	2	4.4	8	180	75	40.9	6.4	7	5	47	28	0.7	5.1	2	0.86
19*	2	2	5.3	10	185	100	35.0	6.0	7	4	40	60	1.7	7.0	2	0.76
20*	2	2	4.9	12	135	85	27.5	8.5	7	1	7	78	2.8	7.7	2	0.64
21*	2	2	4.9	8	240	50	49.0	9.6	7	5	31	19	0.4	5.3	2	0.92
22*	2	2	5.4	15	125	85	23.2	10.6	7	6	34	51	2.2	7.6	2	0.71
Total	-	47	125.7	158	4,476	1,148	-	-	-	97	741	407	13.1	138.8	47	20.05

* To be re-assigned to Western District

** (2) 7th Street Incinerator; (7) St. Louis Incinerator

TABLE A-19

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: WESTERN | Collection Day: WEDNESDAY | No. of Trucks per Day: 28

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
1	1	2	4.5	25	220	100	48.9	15.0	7	8	32	68	1.4	5.9	2	0.76
2	3	2	5.8	23	200	105	34.5	13.1	7	20	92	13	0.4	6.2	2	0.94
3	1	2	5.3	21	170	90	32.1	14.0	7	5	21	69	2.2	7.5	2	0.71
4	1	2	4.3	24	145	75	33.7	19.2	7	9	28	47	1.4	5.7	2	0.75
5	1	2	4.6	19	168	122	36.5	9.3	7	8	52	70	1.9	6.5	2	0.71
6	1	2	4.6	23	220	90	47.9	15.3	7	9	35	55	1.1	5.7	2	0.81
7	3	2	7.2	21	221	84	30.7	15.0	7	20	80	4	0.1	7.3	2	0.99
8	1	2	5.5	30	165	130	30.0	13.8	7	10	44	86	2.9	8.4	2	0.65
9	1	2	4.4	24	145	110	33.0	13.1	7	6	28	82	2.5	6.9	2	0.64
10	1	2	4.0	22	150	78	37.5	16.9	7	6	21	57	1.5	5.5	2	0.73
11	1	2	4.3	20	152	83	35.4	19.5	7	5	15	68	1.9	6.2	2	0.69
12	1	2	4.5	21	105	120	23.3	10.5	7	5	29	91	3.9	8.4	2	0.54
13	1	2	6.0	23	175	100	29.1	13.8	7	5	22	78	2.7	8.7	2	0.69
14	1	2	5.1	21	210	70	41.2	18.0	7	8	27	43	1.0	6.1	2	0.83
15	1	2	4.3	26	162	85	37.7	18.4	7	9	29	56	1.5	5.8	2	0.74
16	1	2	4.3	31	185	90	43.2	20.6	7	14	41	49	1.1	5.4	2	0.80
17	1	2	4.8	28	160	90	33.3	18.7	7	15	48	42	1.3	6.1	2	0.79
18	1	2	4.9	30	170	95	34.7	19.0	7	12	41	54	1.6	6.5	2	0.75
19	1	1	3.5	16	130	70	37.1	13.7	7	8	35	35	0.9	4.4	1	0.80
20	1	2	5.5	24	125	120	22.7	12.0	7	10	50	70	3.1	8.6	2	0.64
21	1	2	3.8	26	145	90	38.2	17.3	7	14	49	41	1.1	4.9	2	0.78
22	1	3	7.4	32	290	140	39.2	13.7	7	24	105	36	0.9	8.3	3	0.89
23	1	2	5.1	32	185	105	36.3	18.3	7	18	59	46	1.3	6.4	2	0.80
24	1	2	4.5	34	150	145	33.3	14.0	7	24	103	42	1.3	5.8	2	0.78

Note: See following page for coding information

TABLE A-19 (Continued)

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: WESTERN Collection Day: WEDNESDAY No. of Trucks per Day: 28

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec. (min.)	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.		Addit.	Total		
25	1	2	5.5	30	120	110	21.8	16.3	7	25	92	18	0.8	6.3	2	0.87
26	1	2	4.3	31	140	97	32.6	19.2	7	13	41	56	1.7	6.0	2	0.72
27	1	2	4.5	31	108	92	24.0	20.2	7	16	48	44	1.8	6.3	2	0.71
28	1	2	4.5	40	170	100	37.7	24.0	7	24	60	40	1.1	5.6	2	0.80
Total	-	56	137.0	728	4,686	2,796	-	-	-	350	1,327	1,459	44.4	181.4	56	21.22

** (1) Algiers Incinerator
(3) Fla. Ave. Incinerator
(7) St. Louis Incinerator

TABLE A-20

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: EASTERN I　Collection Day: WEDNESDAY　No. of Trucks per Day: 22

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec. (min.)	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.		Addit.	Total		
1*	3	2	7.6	8	295	60	38.8	8.0	7	6	45	15	0.4	8.0	2	0.95
2*	3	2	9.0	6	190	55	21.2	6.6	7	5	45	10	0.5	9.5	2	0.95
3	3	2	9.2	7	221	80	24.0	5.3	3	5	57	23	1.0	10.2	2	0.90
4*	3	2	7.8	9	195	70	25.0	7.7	7	5	39	31	1.2	9.0	2	0.87
5	3	2	9.7	6	220	45	22.7	8.0	3	5	38	7	0.3	10.0	2	0.97
6	3	2	9.6	6	215	40	22.4	9.0	3	5	33	7	0.3	9.9	2	0.97
7*	3	2	7.0	8	190	75	27.1	6.5	7	8	75	0	0	7.0	2	1.00
8	3	2	7.4	7	175	85	23.7	4.9	3	5	61	24	1.0	8.4	2	0.88
9	3	2	6.5	8	240	71	36.9	6.8	3	7	62	9	0.2	6.7	2	0.97
10	3	2	8.1	10	255	103	31.5	5.8	3	9	92	11	0.3	8.4	2	0.96
11	3	2	8.5	11	162	100	19.0	6.6	3	11	100	0	0	8.5	2	1.00
12	3	2	7.4	1	195	20	26.4	3.0	3	1	20	0	0	7.4	2	1.00
13	3	2	9.8	7	220	96	22.4	4.4	3	7	96	0	0	9.8	2	1.00
14	3	2	7.7	5	210	55	27.3	5.5	3	6	66	11	0.4	8.1	2	0.95
15	3	2	6.3	6	215	60	34.1	6.0	3	6	60	0	0	6.3	2	1.00
16	6	2	6.4	24	170	115	26.6	12.5	3	2	10	105	3.9	10.3	2	0.62
17	3	2	6.9	3	285	20	41.3	9.0	3	3	20	0	0	6.9	2	1.00
18	3	2	7.6	2	270	45	35.5	4.0	3	2	30	15	0.4	8.0	2	0.95
19	6	2	9.6	32	215	100	22.4	19.2	3	6	28	72	3.2	12.8	3	0.75
20	3	2	7.3	5	240	75	32.9	4.0	3	4	60	15	0.5	7.8	2	0.94
21	3	2	6.3	6	260	57	41.3	6.5	3	6	57	0	0	6.3	2	1.00
22	3	2	7.3	2	248	35	34.0	3.4	3	2	35	0	0	7.3	2	1.00
Totals	-	44	173.0	179	4,886	1,462	-	-	-	116	1,129	355	13.6	186.6	45	20.63

* To be re-assigned to Western District

** (3) Florida Avenue Incinerator; (6) Gentilly Dump; (7) St. Louis Incinerator

TABLE A-21

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: EASTERN II | Collection Day: WEDNESDAY | No. of Trucks per Day: 23

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec. (min.)	Tons/Day		No. of Loads	Trucks Req'd. • to Serve Area
					Collec.	Haul				Miles	Min.		Addit.	Total		
1	3	2	8.6	4	285	70	33.1	3.4	4	30	116	-46	-1.4	7.2	2	1.19
2	3	2	6.5	5	205	80	31.5	3.8	4	29	112	-32	-1.0	5.5	2	1.18
3	3	2	4.8	10	200	60	41.7	10.0	4	28	108	-48	-1.1	3.7	2	1.30
4	6	2	9.6	21	205	120	21.4	10.5	4	27	104	16	0.8	10.4	2	0.92
5	3	1	5.1	6	230	33	45.0	10.9	4	14	54	-21	-0.5	4.6	1	1.11
6	3	2	6.5	7	130	75	20.0	5.6	4	29	112	-37	-1.4	5.1	2	1.27
7	6	2	9.8	32	150	105	15.3	18.3	4	31	120	-15	-1.0	8.8	2	1.11
8*	3	1	5.9	4	237	48	40.2	5.0	3	4	48	0	0	5.9	1	1.00
9*	6	1	5.7	16	167	133	29.3	7.2	3	6	50	83	2.8	8.5	2	0.67
10*	3	1	5.2	3	115	15	22.1	12.0	3	4	20	- 5	-0.2	5.0	1	1.04
11*	6	2	6.1	29	240	165	39.3	10.5	3	6	34	131	3.3	9.4	2	0.65
12*	3	1	5.5	2	243	22	44.2	5.5	3	3	33	-11	-0.3	5.2	1	1.06
13	3	2	6.9	10	165	90	23.9	6.7	4	24	93	- 3	-0.1	6.8	2	1.01
14	6	2	6.3	29	120	105	19.0	16.5	4	14	54	51	2.7	9.0	2	0.70
15	6	2	8.0	35	240	160	30.0	13.1	4	26	101	58	1.9	9.9	2	0.81
16	6	1	4.0	14	150	75	37.5	11.2	4	13	50	27	0.7	4.7	1	0.85
17	3	1	4.0	7	225	30	56.3	14.0	4	16	62	-34	-0.6	3.4	1	1.18
18	3	1	4.8	7	190	45	39.6	9.3	4	11	62	-19	-0.5	4.3	1	1.11
19	6	2	6.7	30	137	123	20.4	14.6	4	29	112	10	0.5	7.2	2	0.93
20	6	1	5.7	16	205	65	36.4	14.7	4	15	58	7	0.2	5.9	1	0.97
21	6	2	6.9	35	227	118	32.9	17.8	4	29	112	7	0.2	7.1	2	0.97
22	6	2	8.7	24	140	125	16.1	11.5	4	32	124	1	0.6	9.3	2	0.94
23	3	1	4.2	4	160	30	38.1	8.0	4	15	58	-28	-0.7	3.5	1	1.20
Totals	-	36	145.5	350	4,366	1,892	-	-	-	432	1,797	92	4.9	150.4	37	23.17

* To be re-assigned to Eastern I District

** (3) Florida Avenue Incinerator; (4) N. O. East Incinerator; (6) Gentilly Dump

TABLE A-22

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: ALGIERS and NIGHT | Collection Day: WEDNESDAY | No. of Trucks per Day: 8

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec. (min.)	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.		Addit.	Total		
							ALGIERS									
1	1	2	6.1	5	282	31	46	9.7	1	5	31	0	0	6.1	2	1.00
2	1	1	4.5	4	220	21	49	11.4	1	4	21	0	0	4.5	1	1.00
3	1	2	5.0	12	255	53	51	13.5	1	12	53	0	0	5.0	2	1.00
4	1	2	5.1	13	250	70	49	11.1	1	12	65	5	0.1	5.2	2	0.98
5	1	1	4.4	6	200	18	46	20.0	1	6	18	0	0	4.4	1	1.00
6	1	1	3.8	6	165	15	44	24.0	1	6	15	0	0	3.8	1	1.00
7	1	1	4.6	8	235	29	51	16.5	1	8	29	0	0	4.6	1	1.00
8	1	1	4.7	5	165	33	35	9.1	1	5	33	0	0	4.7	1	1.00
Total	-	11	38.2	59	1,772	270	-	-	-	58	265	5	0.1	38.3	11	7.98
							NIGHT									
1	2	2	6.4	11	185	45	29	14.6	2	11	45	0	0	6.4	2	1.00
2	2	2	6.2	9	160	60	26	9.0	2	9	60	0	0	6.2	2	1.00
3	2	2	6.2	13	145	55	23	14.2	2	13	55	0	0	6.2	2	1.00
4	2	2	6.8	5	241	25	35	14.4	2	4	17	8	0.2	7.0	2	0.97
5	2	2	6.3	9	125	50	20	10.8	2	9	50	0	0	6.3	2	1.00
6	2	2	7.3	8	250	55	34	8.7	2	8	55	0	0	7.3	2	1.00
7	2	2	8.0	8	250	65	31	7.4	2	8	65	0	0	8.0	2	1.00
8	2	2	6.5	7	253	53	39	7.9	2	7	53	0	0	6.5	2	1.00
Total	-	16	53.7	70	1,609	408	-	-	-	69	400	8	0.2	53.9	16	7.97

** (1) Algiers Incinerator; (2) 7th Street Incinerator

TABLE A-23

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: CENTRAL
Collection Day: THURSDAY
No. of Trucks per Day: 22

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
1	2	3	5.6	18	210	120	37.5	9.0	2	18	120	0	0	5.6	3	1.00
2	2	2	5.1	8	180	70	35.3	6.9	2	8	70	0	0	5.1	2	1.00
3	2	2	5.4	10	170	40	31.5	15.0	2	10	40	0	0	5.4	2	1.00
4	2	2	6.5	9	185	57	28.4	9.5	2	9	57	0	0	6.5	2	1.00
5	2	2	6.0	8	175	60	29.1	8.0	2	8	60	0	0	6.0	2	1.00
6	2	2	6.2	6	193	22	31.1	16.4	2	6	22	0	0	6.2	2	1.00
7	2	2	6.8	7	225	37	33.1	11.4	2	7	37	0	0	6.8	2	1.00
8	2	2	4.6	11	170	55	36.9	12.0	2	11	55	0	0	4.6	2	1.00
9	2	3	6.4	9	255	90	39.8	7.7	2	9	70	0	0	6.4	3	1.00
10	2	2	5.3	5	290	30	54.7	10.0	2	5	30	0	0	5.3	2	1.00
11	2	2	6.9	4	331	37	48.0	6.5	2	4	37	0	0	6.9	2	1.00
12	2	2	6.8	5	200	30	29.4	10.0	2	5	30	0	0	6.8	2	1.00
13	2	2	6.0	4	195	15	32.5	16.0	2	4	15	0	0	6.0	2	1.00
14	2	2	6.5	3	345	35	53.1	5.2	2	3	35	0	0	6.5	2	1.00
15	2	2	6.0	2	225	20	37.5	6.0	2	2	20	0	0	6.0	2	1.00
16	2	2	7.1	2	225	30	31.7	4.0	2	2	30	0	0	7.1	2	1.00
17	2	3	7.2	3	236	44	32.8	4.1	2	3	44	0	0	7.2	3	1.00
18	2	2	5.4	5	235	35	43.5	8.6	2	5	35	0	0	5.4	2	1.00
19	2	2	5.6	5	180	80	32.2	4.0	2	5	80	0	0	5.6	2	1.00
20	2	2	5.8	5	180	35	31.0	8.6	2	5	35	0	0	5.8	2	1.00
21	2	2	5.4	4	215	25	39.8	9.6	2	4	25	0	0	5.4	2	1.00
22	2	2	6.2	4	195	40	31.5	6.0	2	4	40	0	0	6.2	2	1.00
Total	-	47	132.8	137	4,815	987	-	-	-	137	987	0	0	132.8	47	22.00

** (2) 7th Street Incinerator

TABLE A-24

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: WESTERN — Collection Day: THURSDAY — No. of Trucks per Day: 28

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
1*	1	1	4.7	14	240	55	51.0	12.9	2	6	28	27	0.5	5.2	1	0.90
2*	7	2	5.0	20	190	100	38.0	12.0	2	11	55	45	1.2	6.2	2	0.81
3*	1	2	4.9	28	172	152	34.7	11.0	2	10	54	98	2.8	7.7	2	0.64
4*	1	2	5.5	24	175	80	31.8	18.0	2	8	27	53	1.7	7.2	2	0.76
5*	7	2	4.3	16	212	69	49.4	13.9	2	7	30	39	0.8	5.1	2	0.84
6*	7	2	4.6	20	205	76	44.6	16.7	2	8	29	47	1.0	5.6	2	0.82
7*	1	2	4.5	36	133	101	29.6	21.2	2	10	28	73	2.5	7.0	2	0.64
8*	7	2	4.9	15	180	62	36.8	14.5	2	5	31	31	0.8	5.7	2	0.86
9*	1	2	4.6	33	140	125	30.4	15.8	2	9	34	91	3.0	7.6	2	0.61
10*	7	2	5.6	15	123	82	22.0	11.0	2	8	44	38	1.7	7.3	2	0.77
11*	7	2	5.4	18	140	80	26.0	13.5	2	10	44	36	1.4	6.8	2	0.79
12*	7	2	4.3	15	185	73	43.0	12.3	2	10	49	24	0.6	4.9	2	0.88
13*	7	2	4.4	12	110	65	25.0	11.2	2	7	38	27	1.1	5.5	2	0.80
14*	1	2	4.8	26	210	95	43.8	16.5	2	9	33	62	1.4	6.2	2	0.77
15	7	2	6.2	15	173	94	27.9	9.6	7	14	88	6	0.2	6.4	2	0.97
16	1	2	6.4	28	320	120	50.0	14.0	7	13	56	64	1.3	7.7	2	0.83
17	7	2	5.9	14	205	70	34.7	12.0	7	14	70	0	0	5.9	2	1.00
18	7	2	7.3	15	160	72	21.9	12.5	7	15	72	0	0	7.3	2	1.00
19*	7	2	5.9	20	198	100	33.6	12.0	2	13	70	30	0.9	6.8	2	0.87
20	7	1	3.6	17	140	38	38.9	11.0	7	6	33	5	0.1	3.7	1	0.97
21*	7	2	6.7	18	145	101	23.8	10.7	2	12	67	34	1.4	7.5	2	0.81
22	1	2	6.9	35	290	120	42.0	17.5	7	12	41	79	1.9	8.8	2	0.78
23	7	2	5.9	10	175	48	29.7	12.5	7	10	48	0	0	5.9	2	1.00
24	7	2	5.1	13	135	66	26.5	11.8	7	12	61	5	0.2	5.3	2	0.96

Note: See following page for coding information

TABLE A-24 (Continued)

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: WESTERN
Collection Day: THURSDAY
No. of Trucks per Day: 28

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec. (min.)	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.		Addit.	Total		
25*	7	2	4.8	11	223	49	46.5	13.4	2	9	40	9	0.2	5.0	2	0.96
26	1	2	4.9	16	160	90	32.6	10.7	7	11	62	28	0.9	5.8	2	0.84
27*	7	2	4.9	13	192	57	39.2	13.7	2	10	44	13	0.3	5.2	2	0.94
28	7	2	4.8	14	115	55	27.4	15.3	7	12	47	8	0.3	5.1	2	0.94
Total	-	54	146.2	531	5,044	2,295	-	-	-	281	1,323	972	28.2	174.4	54	23.76

* To be re-assigned to Central District

** (1) Algiers Incinerator

(2) 7th Street Incinerator

(7) St. Louis Incinerator

TABLE A-25

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: EASTERN I Collection Day: THURSDAY No. of Trucks per Day: 22

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec. (min.)	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.		Addit.	Total		
1*	6	2	8.1	14	210	90	26.0	9.3	7	8	52	38	1.5	9.6	2	0.84
2	6	2	9.2	26	250	125	27.2	12.5	3	7	51	74	2.7	11.9	3	0.77
3*	6	2	8.2	36	290	140	35.4	15.4	7	10	39	101	2.9	11.1	2	0.74
4	3	2	8.4	20	210	75	25.0	16.0	3	5	19	56	2.2	10.6	2	0.79
5	6	2	8.4	32	210	75	25.0	26.0	3	4	9	66	2.6	11.0	2	0.76
6	6	2	7.7	29	250	125	32.5	13.9	3	4	17	108	3.3	11.0	2	0.70
7*	6	2	6.4	12	290	50	45.4	14.4	7	12	50	0	0	6.4	2	1.00
8*	6	2	10.2	23	210	130	20.6	10.6	7	9	76	54	2.6	2.6	3	0.80
9	6	2	7.4	33	200	130	27.0	15.2	3	12	47	83	3.1	10.5	2	0.71
10	3	2	8.8	10	200	90	22.7	6.7	3	10	20	0	0	8.8	2	1.00
11	6	2	8.4	28	207	108	24.6	15.5	3	8	46	62	2.5	10.9	3	0.77
12	6	2	7.4	33	210	165	28.4	12.0	3	14	70	95	3.3	10.7	2	0.69
13	3	2	8.4	16	310	110	37.0	8.7	3	16	110	0	0	8.4	2	1.00
14	6	2	6.3	36	215	135	34.1	16.0	3	13	49	86	2.5	8.8	2	0.72
15	3	2	6.0	15	180	85	30.0	10.6	3	15	85	0	0	6.0	2	1.00
16	6	2	7.6	33	215	135	28.3	14.6	3	14	58	77	2.7	10.3	2	0.74
17	6	2	6.5	32	195	150	30.0	12.8	3	14	66	84	2.8	9.3	2	0.70
18	3	2	7.2	14	210	75	29.2	11.2	3	14	75	0	0	7.2	2	1.00
19	3	2	7.9	15	315	120	40.0	7.5	3	13	104	16	0.4	8.3	2	0.95
20	3	2	6.5	15	160	110	24.6	8.2	3	15	110	0	0	6.5	2	1.00
21	6	2	7.2	33	155	125	21.6	15.8	3	14	53	72	3.3	10.5	2	0.69
22	6	2	6.7	33	215	145	32.1	13.6	3	10	44	101	3.1	9.8	2	0.68
Total	-	44	168.9	538	4,907	2,943	-	-	-	241	1,320	1,173	41.5	210.4	47	18.05

* To be re-assigned to Western District

** (3) Florida Avenue Incinerator; (6) Gentilly Dump; (7) St. Louis Incinerator

TABLE A-26

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: EASTERN II — Collection Day: THURSDAY — No. of Trucks per Day: 23

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
1	6	1	5.0	6	175	60	35.0	6.0	4	6	60	0	0	5.0	1	1.00
2	6	2	10.1	19	195	99	19.3	11.5	4	10	81	18	1.0	11.1	3	0.90
3	6	3	5.1	22	240	120	47.1	11.0	4	12	65	55	1.2	6.3	3	0.81
4	6	2	6.6	21	180	125	27.3	10.0	4	14	84	41	1.5	8.1	2	0.81
5	6	2	8.4	25	175	115	20.8	13.0	4	17	78	37	1.8	10.2	2	0.83
6	6	2	8.8	25	180	145	20.5	10.3	4	20	116	29	1.4	10.2	2	0.86
7*	6	2	8.8	29	185	80	21.1	21.8	3	6	17	63	3.0	11.8	2	0.75
8*	6	1	4.9	14	185	75	37.8	11.2	3	2	22	53	1.4	6.3	2	0.78
9*	6	1	5.1	15	185	145	36.3	6.2	3	4	78	67	1.9	7.0	2	0.73
10*	6	1	3.5	15	115	70	32.9	12.8	3	3	14	56	1.7	5.2	1	0.67
11	6	2	6.9	26	190	115	27.6	13.5	4	26	115	0	0	6.9	2	1.00
12*	3	2	8.0	7	280	65	35.0	6.5	3	7	65	0	0	8.0	2	1.00
13	3	2	4.4	20	145	190	33.0	6.3	4	22	210	-20	-0.6	3.8	2	1.15
14	6	2	6.7	25	165	100	24.6	15.0	4	24	96	4	0.2	6.9	2	0.97
15	6	2	5.0	29	192	115	38.4	15.1	4	24	95	20	0.5	5.5	2	0.90
16	6	1	4.4	18	120	115	27.3	9.4	4	13	83	32	1.2	5.6	1	0.79
17	6	2	7.0	76	340	76	48.6	12.6	4	6	29	47	1.0	8.0	2	0.87
18	6	1	5.1	14	145	62	28.4	13.5	4	2	18	44	1.5	6.6	2	0.77
19	6	2	6.3	11	255	80	40.5	8.3	4	2	15	65	1.6	7.9	2	0.79
20	6	2	5.5	16	255	120	46.4	8.0	4	2	15	105	2.3	7.8	2	0.71
21	6	2	8.6	21	259	141	30.2	8.9	4	6	60	81	2.7	11.3	3	0.76
22	6	2	8.1	25	266	100	32.9	15.0	4	14	56	44	1.3	9.4	2	0.86
23	6	2	5.4	30	231	110	42.7	16.4	4	18	65	45	1.1	6.5	2	0.84
Total	-	41	147.7	449	4,658	2,423	-	-	-	532	1,537	886	27.7	175.4	46	19.55

* To be re-assigned to Eastern I District

** (3) Florida Ave. Incinerator; (4) N. O. East Incinerator; (6) Gentilly Dump

TABLE A-27

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: ALGIERS and NIGHT Collection Day: THURSDAY No. of Trucks per Day: 8

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec. (min.)	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.		Addit.	Total		
									ALGIERS							
1	1	2	4.8	9	160	46	33.3	10.7	1	10	56	-10	-0.3	4.5	2	1.06
2	1	1	4.5	4	165	34	36.7	7.1	1	4	34	0	0	4.5	1	1.00
3	1	2	5.6	8	170	38	30.4	12.6	1	5	24	14	0.5	6.1	2	0.92
4	1	1	3.9	2	170	16	43.6	7.5	1	3	24	- 8	-0.2	3.7	1	1.05
5	1	1	4.5	3	125	51	29.8	3.5	1	3	51	0	0	4.5	1	1.00
6	1	2	5.7	5	183	75	32.1	4.0	1	5	75	0	0	5.7	2	1.00
7	1	2	5.3	7	235	41	44.4	10.2	1	6	36	5	0.1	5.4	2	0.98
8	1	2	5.9	4	263	27	44.6	8.9	1	6	40	-13	-0.3	5.6	2	1.05
Total	-	13	40.2	42	1,471	328	-	-	-	42	340	-12	-0.2	40.0	13	8.06
									NIGHT							
1	2	2	6.8	12	215	55	31.6	13.1	2	11	50	5	0.2	7.0	2	0.97
2	2	2	7.2	12	190	50	26.4	14.4	2	12	50	0	0	7.2	2	1.00
3	2	3	7.7	19	198	72	25.8	15.8	2	19	72	0	0	7.7	3	1.00
4	2	2	7.4	4	141	66	19.1	3.6	2	4	66	0	0	7.4	2	1.00
5	2	2	7.2	6	210	30	29.2	12.0	2	6	30	0	0	7.2	2	1.00
6	2	2	7.1	10	190	50	26.8	12.0	2	10	50	0	0	7.1	2	1.00
7	2	2	7.9	9	210	60	26.6	9.0	2	9	60	0	0	7.9	2	1.00
8	2	2	6.6	4	186	34	28.2	7.1	2	4	34	0	0	6.6	2	1.00
Total	-	17	57.9	76	1,540	417	-	-	-	75	412	0	0.2	58.1	17	7.97

** (1) Algiers Incinerator; (2) 7th Street Incinerator

TABLE A-28

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: CENTRAL Collection Day: FRIDAY No. of Trucks per Day: 22

	PRESENT OPERATION - 3 Incinerators and 2 Dumps								FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec. (min.)	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.		Addit.	Total		
1	2	3	7	6	272	57	38.8	6.3	2	6	57	0	0	7.0	3	1.00
2	2	2	6.5	4	205	20	31.5	12.0	2	5	20	0	0	6.5	2	1.00
3	2	2	6.1	5	180	30	30.0	10.0	2	5	30	0	0	6.1	2	1.00
4	2	2	7.5	6	225	35	30.0	10.3	2	6	35	0	0	7.5	2	1.00
5	2	2	6.1	7	235	65	38.6	6.5	2	7	65	0	0	6.1	2	1.00
6	2	2	7.9	5	310	40	39.2	7.5	2	5	40	0	0	7.9	2	1.00
7	2	3	8.2	3	260	40	31.7	4.5	2	3	40	0	0	8.2	3	1.00
8	2	2	4.6	1	210	40	45.7	-	2	1	40	0	0	4.6	2	1.00
9	2	3	7.5	6	290	50	38.7	7.2	2	5	50	0	0	7.5	3	1.00
10	2	2	6.2	2	355	40	57.3	-	2	2	40	0	0	6.2	2	1.00
11	2	3	8.8	7	321	37	36.5	11.4	2	8	37	0	0	8.8	3	1.00
12	2	2	8.0	6	300	45	37.5	8.0	2	4	45	0	0	8.0	2	1.00
13*	2	2	6.5	6	201	24	31.0	15.0	7	6	24	0	0	6.5	2	1.00
14*	2	2	5.5	11	190	45	34.5	14.7	7	4	16	29	0.8	6.3	2	0.87
15*	2	2	6.4	9	275	40	44.0	13.5	7	1	4	36	0.8	7.2	2	0.89
16*	2	2	6.6	11	151	57	23.0	12.0	7	4	21	36	1.6	8.2	2	0.81
17*	2	2	5.0	12	136	74	27.2	11.0	7	5	31	43	1.6	6.6	2	0.76
18*	2	2	4.7	8	190	75	40.5	6.5	7	5	47	28	0.7	5.4	2	0.87
19*	2	3	7.5	15	280	125	37.3	7.5	7	6	50	75	2.0	9.5	3	0.79
20*	2	2	5.6	12	195	80	34.8	9.0	7	1	7	73	2.1	7.7	2	0.73
21*	2	2	5.1	7	220	50	43.1	8.5	7	5	36	14	0.3	5.4	2	0.94
22*	2	2	6.1	14	175	55	28.7	15.0	7	6	24	31	1.1	7.2	2	0.85
Total	-	49	143.4	163	5,176	1,124	-	-	-	100	759	365	11.0	154.4	49	20.51

* To be re-assigned to Western District

** (2) 7th Street Incinerator; (7) St. Louis Incinerator

TABLE A-29

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: WESTERN | Collection Day: FRIDAY | No. of Trucks per Day: 28

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec. (min.)	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.		Addit.	Total		
1	1	2	5.2	25	250	130	48.1	11.5	7	8	42	88	1.8	7.0	2	0.74
2	1	2	4.5	36	190	110	42.3	19.6	7	20	61	49	1.2	5.7	2	0.79
3	1	2	6.3	20	180	125	28.6	9.6	7	5	31	94	3.3	9.6	2	0.66
4	1	2	5.4	27	195	90	36.2	18.0	7	9	30	60	1.7	7.1	2	0.76
5	1	2	6.4	20	242	83	37.8	14.5	7	8	33	50	1.3	7.7	2	0.83
6	1	2	4.7	23	195	90	41.5	15.4	7	9	35	55	1.3	6.0	2	0.78
7	3	1	5.0	11	159	46	31.8	14.4	7	10	42	4	0.1	5.1	1	0.98
8	1	2	6.0	28	165	95	27.5	17.7	7	10	34	61	2.2	8.2	2	0.73
9	1	2	4.6	24	170	110	37.0	13.1	7	6	28	82	2.2	6.8	2	0.68
10	1	2	4.6	22	148	77	32.2	17.2	7	6	21	56	1.7	6.3	2	0.73
11	1	2	6.1	20	242	93	39.7	12.9	7	5	23	70	1.8	7.9	2	0.77
12	1	2	4.5	22	240	120	53.4	11.0	7	5	27	93	1.8	6.3	2	0.71
13	1	2	5.6	23	200	98	35.7	14.1	7	5	21	77	2.2	7.8	2	0.72
14	1	2	6.5	22	166	74	25.5	17.8	7	8	27	47	1.8	8.3	2	0.78
15	1	1	4.8	15	197	43	41.1	18.1	7	5	17	26	0.6	5.4	1	0.89
16	1	2	4.3	32	135	205	31.4	9.4	7	14	89	116	3.7	8.0	2	0.54
17	1	2	4.4	28	240	100	54.6	16.8	7	15	54	46	0.8	5.2	2	0.85
18	1	2	5.1	30	185	90	36.3	20.0	7	13	39	51	1.4	6.5	2	0.78
19	1	1	4.4	16	210	45	47.6	21.2	7	8	23	22	0.5	4.9	1	0.90
20	1	2	6.6	24	195	120	29.6	12.0	7	10	50	70	2.3	8.9	2	0.74
21	1	2	5.3	26	150	130	28.3	12.0	7	14	70	60	2.1	7.4	2	0.72
22	1	2	6.8	32	280	95	41.2	20.2	7	16	48	47	1.2	8.0	2	0.85
23	1	2	4.4	32	140	100	31.8	19.2	7	18	56	44	1.4	5.8	2	0.76
24	1	2	4.9	34	150	110	30.6	18.5	7	24	78	32	1.0	5.9	2	0.83

Note: See following page for coding information

TABLE A-29 (Continued)

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: WESTERN Collection Day: FRIDAY No. of Trucks per Day: 28

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
25	1	2	5.0	30	129	126	25.8	14.3	7	25	105	21	0.8	5.8	2	0.86
26	1	2	4.7	30	125	100	26.6	18.0	7	13	43	57	2.1	6.8	2	0.69
27	1	2	5.9	31	188	92	31.8	20.2	7	16	48	44	1.4	7.3	2	0.81
28	1	2	4.2	40	195	100	46.4	24.0	7	24	60	40	0.9	5.1	2	0.82
Total	-	53	146.2	721	5,261	2,797	-	-	-	329	1,235	1,562	44.6	190.8	53	21.70

** (1) Algiers Incinerator
(3) Fla. Ave. Inc.
(7) St. Louis Inc.

TABLE A-30

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: EASTERN I   Collection Day: FRIDAY   No. of Trucks per Day: 22

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
1*	6	2	9.4	35	220	155	23.4	13.5	7	6	40	115	5.0	14.4	3	0.65
2*	3	2	9.9	6	255	75	25.8	4.8	7	5	63	12	0.5	10.4	2	0.95
3	3	2	12.7	8	220	63	17.4	7.6	3	5	60	3	0.2	12.9	2	0.98
4*	6	2	7.6	34	165	100	21.6	20.4	7	5	22	78	3.6	11.2	3	0.68
5	6	2	8.3	18	175	80	21.1	13.5	3	5	22	58	2.8	11.1	2	0.75
6	3	2	8.3	6	215	105	25.9	3.4	3	5	88	17	0.7	9.0	2	0.92
7*	3	2	6.9	8	250	95	36.3	5.1	7	8	95	0	0	6.9	2	1.00
8	6	2	6.5	32	170	107	26.2	18.0	3	5	17	90	3.4	9.9	2	0.66
9	6	2	6.9	34	240	150	34.7	13.6	3	7	31	119	3.4	10.3	2	0.67
10	3	2	7.5	10	265	65	35.3	9.2	3	9	59	6	0.2	7.7	2	0.97
11	6	2	7.2	32	188	127	26.1	15.1	3	11	44	83	3.2	10.4	2	0.69
12	6	2	5.8	26	215	130	37.1	12.0	3	1	5	125	3.4	9.2	2	0.63
13	6	2	8.7	47	225	230	25.8	12.2	3	7	51	179	6.9	15.6	3	0.56
14	3	2	7.2	5	225	50	31.3	6.0	3	6	60	- 10	-0.4	6.8	2	1.06
15	3	2	6.8	6	195	50	28.7	7.2	3	6	50	0	0	6.8	2	1.00
16	6	2	6.2	24	172	123	27.7	11.7	3	2	10	113	4.0	10.2	2	0.61
17	3	2	9.4	4	250	50	26.6	4.8	3	3	50	0	0	9.4	2	1.00
18	3	2	9.1	3	280	55	30.8	3.3	3	2	36	19	0.6	9.7	2	0.94
19	3	2	7.1	6	265	40	37.3	9.0	3	6	40	0	0	7.1	2	1.00
20	6	2	6.5	29	240	170	36.9	10.2	3	4	24	146	4.0	10.5	2	0.62
21	6	2	5.9	30	160	155	27.1	11.6	3	6	31	124	4.6	10.5	2	0.56
22	6	2	3.5	28	200	180	57.2	9.3	3	2	13	167	2.9	6.4	2	0.55
Total	-	44	167.4	431	4,790	2,355	-	-	-	116	911	1,444	49.0	216.4	47	17.45

* To be re-assigned to Western District

** (3) Florida Avenue Incinerator; (6) Gentilly Dump; (7) St. Louis Incinerator

TABLE A-31

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: EASTERN II

Collection Day: FRIDAY

No. of Trucks per Day: 23

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
1	3	2	7.3	12	285	65	39.1	11.2	4	30	116	-51	-1.3	6.0	2	1.22
2	3	1	4.5	6	180	24	40.0	15.0	4	15	58	-34	-0.9	3.6	1	1.25
3	3	2	7.3	11	220	70	30.1	9.4	4	28	108	-38	-1.3	6.0	2	1.22
4	6	2	6.3	21	240	120	38.1	10.5	4	27	104	16	0.4	6.7	2	0.94
5	6	2	3.9	31	270	120	69.2	15.5	4	28	108	12	0.2	4.1	2	0.95
6	6	2	8.7	37	190	100	21.8	22.2	4	29	112	-12	-0.6	8.1	2	1.07
7	6	2	10.4	32	315	95	20.7	19.2	4	31	120	-25	-1.2	9.2	2	1.13
8*	6	1	5.4	16	165	55	30.6	17.4	3	4	28	27	0.9	6.3	2	0.86
9*	6	2	5.4	31	195	155	36.1	12.0	3	6	30	125	3.5	8.9	2	0.61
10*	3	1	4.3	4	155	35	36.1	6.9	3	4	35	0	0	4.3	1	1.00
11*	6	2	6.1	27	200	165	32.8	10.5	3	6	34	131	4.0	10.1	2	0.60
12*	6	2	5.7	26	270	90	47.4	17.4	3	6	21	69	1.5	7.2	2	0.79
13	3	2	5.3	10	225	175	42.5	3.4	4	24	93	82	1.9	7.2	2	0.74
14	6	2	6.3	29	170	100	26.9	17.4	4	14	54	46	1.7	8.0	2	0.79
15	6	2	5.5	35	205	129	37.3	16.3	4	26	100	29	0.8	6.3	2	0.87
16	6	1	4.5	14	180	65	40.0	12.9	4	13	50	15	0.4	4.9	1	0.92
17	6	1	3.1	17	130	110	41.9	9.3	4	16	62	48	1.1	4.2	1	0.74
18	3	1	4.5	7	130	35	28.9	12.0	4	16	62	-27	-0.9	3.6	1	1.25
19	6	2	4.4	30	170	117	38.6	15.4	4	29	112	5	0.1	4.5	2	0.98
20	3	1	3.7	6	195	40	52.7	9.0	4	15	58	-18	-0.3	3.4	1	1.09
21	6	2	7.1	35	252	148	35.5	14.2	4	29	112	36	1.0	8.1	2	0.88
22	6	2	7.4	24	200	98	27.0	14.7	4	32	124	-26	-1.0	6.4	2	1.15
23	6	2	4.4	32	205	150	46.6	12.8	4	30	116	34	0.7	5.1	2	0.86
Total	-	39	131.5	493	4,647	2,261	-	-	-	458	1,817	444	10.7	142.2	40	21.91

* To be re-assigned to Eastern I District

** (3) Florida Avenue Incinerator; (4) N. O. East Incinerator; (6) Gentilly Dump

TABLE A-32

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: ALGIERS and NIGHT | Collection Day: FRIDAY | No. of Trucks per Day: 8

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators								
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
ALGIERS																
1	1	2	4.5	5	180	40	40.0	7.5	1	5	40	0	0	4.5	2	1.00
2	1	2	6.2	8	240	50	37.7	9.6	1	8	50	0	0	6.2	2	1.00
3	1	2	5.9	10	257	49	43.6	12.2	1	12	59	-10	-0.2	5.7	2	1.04
4	1	2	5.6	12	200	41	35.7	17.5	1	12	41	0	0	5.6	2	1.00
5	5	2	7.0	16	330	40	47.1	14.0	1	12	51	- 4	-0.1	6.9	2	1.01
6	5	2	5.3	15	230	46	43.4	19.5	1	6	18	28	0.7	6.0	2	0.89
7	1	2	5.9	16	175	116	29.7	8.3	1	16	105	11	0.4	6.3	2	0.94
8	1	2	6.1	11	165	70	27.1	9.4	1	10	64	6	0.2	6.3	2	0.97
Total	-	16	46.5	93	1,777	459	-	-	-	81	428	31	1.0	47.5	16	7.85
NIGHT																
1	2	2	6.6	8	175	50	26.5	9.6	2	8	50	0	0	6.6	2	1.00
2	2	2	6.7	10	185	55	27.7	10.9	2	10	55	0	0	6.7	2	1.00
3	2	2	5.5	11	120	90	21.8	7.3	2	11	90	0	0	5.5	2	1.00
4	2	2	7.1	6	173	78	24.4	4.6	2	6	78	0	0	7.1	2	1.00
5	2	2	6.7	9	195	45	29.1	12.0	2	9	45	0	0	6.7	2	1.00
6	2	2	8.1	7	250	55	30.9	7.6	2	7	55	0	0	8.1	2	1.00
7	2	4	12.0	18	270	120	22.5	9.0	2	18	30	90	4.0	16.0	4	0.75
8	2	3	8.1	9	178	122	21.9	4.4	2	9	123	- 1	0	8.1	3	1.00
Total	-	19	60.8	78	1,546	615	-	-	-	78	526	89	4.0	64.8	19	7.75

** (1) Algiers Incinerator; (2) 7th Street Incinerator; (5) Algiers Dump

TABLE A-33

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: CENTRAL Collection Day: SATURDAY No. of Trucks per Day: 22

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
1	2	3	7.4	18	235	76	31.8	14.2	2	18	76	0	0	7.4	3	1.00
2	2	2	6.2	9	180	40	29.0	14.0	2	9	40	0	0	6.2	2	1.00
3	2	2	5.8	10	215	35	37.1	17.1	2	10	35	0	0	5.8	2	1.00
4	2	2	5.1	9	222	38	43.5	14.2	2	9	38	0	0	5.1	2	1.00
5	2	2	6.3	8	235	65	37.3	7.5	2	8	65	0	0	6.3	2	1.00
6	2	2	6.6	6	185	30	28.0	12.0	2	6	30	0	0	6.6	2	1.00
7	2	2	7.8	8	250	45	32.0	11.7	2	8	45	0	0	7.8	2	1.00
8	2	2	5.5	12	216	69	39.3	10.7	2	12	69	0	0	5.5	2	1.00
9	2	3	6.6	9	315	50	47.7	11.0	2	9	50	0	0	6.6	3	1.00
10	2	2	6.1	5	290	40	47.5	8.0	2	5	40	0	0	6.1	2	1.00
11	2	3	8.1	6	342	53	42.2	6.8	2	6	53	0	0	8.1	3	1.00
12	2	2	7.1	5	280	25	39.4	12.0	2	5	25	0	0	7.1	2	1.00
13	2	4	8.3	8	251	52	30.3	9.2	2	8	52	0	0	8.3	4	1.00
14	2	3	9.8	5	347	63	35.4	4.8	2	5	63	0	0	9.8	3	1.00
15	2	3	8.5	3	275	55	32.4	3.3	2	2	55	0	0	8.5	3	1.00
16	2	2	7.1	3	181	39	25.5	4.6	2	3	39	0	0	7.1	2	1.00
17	2	2	8.9	2	280	23	31.5	5.3	2	2	23	0	0	8.9	2	1.00
18	2	2	6.3	5	225	70	35.7	4.3	2	5	70	0	0	6.3	2	1.00
19	2	2	4.8	5	210	70	43.7	4.3	2	5	70	0	0	4.8	2	1.00
20	2	3	7.0	8	250	60	35.7	8.0	2	8	60	0	0	7.0	3	1.00
21	2	2	5.9	4	250	25	42.4	9.6	2	4	25	0	0	5.9	2	1.00
22	2	2	6.4	4	195	40	30.5	6.0	2	4	40	0	0	6.4	2	1.00
Total	-	52	151.6	152	5,429	1,063	-	-	-	151	1,063	0	0	151.6	52	22.00

** (2) 7th Street Incinerator

TABLE A-34

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: WESTERN Collection Day: SATURDAY No. of Trucks per Day: 28

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
1*	1	1	4.7	14	225	55	48.0	15.3	2	6	24	31	0.6	5.3	1	0.89
2*	1	2	4.8	31	150	105	31.2	17.7	2	11	37	68	2.2	7.0	2	0.69
3*	1	2	5.1	28	175	140	34.3	12.0	2	10	50	90	2.6	7.7	2	0.66
4*	1	2	4.8	24	215	85	44.8	17.0	2	8	28	57	1.3	6.1	2	0.79
5*	1	2	4.8	34	195	95	40.6	21.5	2	7	20	75	3.5	8.3	2	0.58
6*	1	2	5.1	26	200	130	40.0	12.0	2	8	40	90	2.3	7.4	2	0.69
7*	2	1	4.1	11	203	52	49.5	12.7	2	5	24	28	0.6	4.7	1	0.87
8*	1	2	5.8	17	183	110	31.5	9.3	2	5	32	48	1.5	7.3	2	0.79
9*	1	2	5.3	32	185	115	34.9	16.7	2	9	32	83	2.4	7.7	2	0.69
10*	1	2	4.1	22	133	75	32.4	17.6	2	8	27	48	1.5	5.6	2	0.73
11*	7	2	5.7	15	180	48	31.6	18.8	2	10	32	16	0.5	6.2	2	0.92
12*	1	2	5.5	38	180	105	32.7	19.8	2	10	28	77	2.4	7.9	2	0.70
13*	1	2	5.0	26	120	120	24.0	13.0	2	7	32	88	3.7	8.7	2	0.58
14*	1	2	5.1	26	240	85	47.0	18.3	2	9	29	56	1.2	6.3	2	0.81
15	1	2	8.1	30	223	99	27.5	18.2	7	14	46	53	1.9	10.0	2	0.81
16	7	2	7.5	17	240	55	32.0	18.5	7	13	42	13	0.4	7.9	2	0.95
17	7	2	6.7	14	285	48	42.5	21.3	7	14	48	0	0	6.7	2	1.00
18	1	2	8.2	33	165	120	20.1	16.5	7	15	56	64	3.2	11.4	2	0.72
19*	1	2	7.4	20	305	102	41.3	11.8	2	13	66	36	0.9	8.3	2	0.89
20	1	1	5.3	14	185	71	34.9	19.8	7	6	60	71	0.3	5.6	2	0.95
21*	1	2	7.1	33	185	100	26.1	19.8	2	12	36	64	2.5	9.6	2	0.74
22	1	2	9.1	35	300	135	33.0	15.6	7	12	69	66	2.0	11.1	3	0.82
23	1	2	6.8	25	145	160	21.3	9.4	7	10	64	96	4.5	11.3	2	0.60
24	1	2	9.3	29	195	150	21.0	15.6	7	12	93	57	2.7	12.0	3	0.77

Note: See following page for coding information

TABLE A-34 (Continued)

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: WESTERN Collection Day: SATURDAY No. of Trucks per Day: 28

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
25 *	1	2	7.3	24	178	152	24.4	9.5	2	9	57	95	3.9	11.2	2	0.65
26	7	4	6.1	24	228	132	37.3	10.9	7	22	121	11	0.3	6.4	4	0.95
27 *	1	2	7.7	25	199	144	25.9	10.4	2	10	58	86	3.3	11.0	2	0.70
28	1	2	7.6	27	155	90	20.4	18.0	7	12	40	50	2.5	10.1	2	0.75
Total	-	55	174.1	694	5,572	2,878	-	-	-	287	1,291	1,586	54.7	228.8	58	21.69

* To be re-assigned to Central District

** (1) Algiers Incinerator

(2) 7th Street Incinerator

(7) St. Louis Incinerator

TABLE A-35

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: EASTERN I | Collection Day: SATURDAY | No. of Trucks per Day: 22

Route No.	PRESENT OPERATION - 3 Incinerators and 2 Dumps Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day Collec.	Minutes Per Day Haul	Min. Per Ton of Collec.	Aver. Travel Speed (mph)	FUTURE OPERATION - 5 Incinerators Disp. Point **	Adjusted Haul Miles	Adjusted Haul Min.	Addit. Time for Collec. (min.)	Tons/Day Addit.	Tons/Day Total	No. of Loads	Trucks Req'd. to Serve Area
1*	3	2	9.8	6	240	60	24.5	6	7	8	80	-20	-0.8	9.0	2	1.09
2	3	2	8.3	8	260	60	31.4	8	3	7	53	7	0.2	8.5	2	0.98
3*	3	2	9.1	8	213	62	23.4	7.7	7	10	78	-16	-0.7	8.4	2	1.08
4	3	2	6.7	5	240	40	35.8	7.5	3	5	40	0	0	6.7	2	1.00
5	3	2	9.1	5	230	40	25.3	7.5	3	5	40	0	0	9.1	2	1.00
6	3	2	10.0	6	255	35	25.5	10.3	3	4	24	11	0.4	10.4	2	0.96
7*	3	2	10.2	12	236	99	23.1	7.3	7	12	99	0	0	10.2	2	1.00
8*	3	2	10.3	10	220	40	21.4	15.0	7	9	36	4	0.2	10.5	2	0.98
9	3	2	9.1	11	210	63	23.1	10.5	3	12	69	- 6	-0.3	8.8	2	1.03
10	3	2	10.7	10	400	105	37.4	5.7	3	10	105	0	0	10.7	2	1.00
11	3	2	9.0	8	270	60	30.0	8.0	3	8	60	0	0	9.0	2	1.00
12	3	2	9.5	14	260	85	27.3	9.9	3	14	85	0	0	9.5	2	1.00
13	3	2	4.8	24	300	80	62.5	18.0	3	16	53	27	0.4	5.2	2	0.92
14	3	2	7.7	15	195	80	25.3	11.2	3	13	70	10	0.4	8.1	2	0.95
15	3	2	5.9	14	205	65	34.8	12.9	3	15	70	- 5	-0.1	5.8	2	1.02
16	3	2	8.5	14	282	85	33.2	9.9	3	14	85	0	0	8.5	2	1.00
17	3	2	8.2	14	300	85	36.6	9.9	3	14	85	0	0	8.2	2	1.00
18	3	2	11.8	15	375	100	31.8	9.0	3	14	93	7	0.2	12.2	2	0.98
19	3	2	7.1	13	240	79	33.8	9.9	3	13	79	0	0	7.1	2	1.00
20	3	2	7.8	15	235	95	30.2	9.5	3	15	95	0	0	7.8	2	1.00
21	3	2	8.7	14	215	70	24.7	12.0	3	14	70	0	0	8.7	2	1.00
22	3	2	6.3	11	255	75	40.5	8.8	3	10	68	7	0.2	6.5	2	0.97
Total	-	44	188.6	252	5,636	1,563	-	-	-	242	1,537	26	0.1	188.7	44	21.95

* To be re-assigned to Western District

** (3) Florida Avenue Incinerator; (7) St. Louis Incinerator

TABLE A-36

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: EASTERN II   Collection Day: SATURDAY   No. of Trucks per Day: 23

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec.	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.	(min.)	Addit.	Total		
1	6	2	7.5	12	360	110	48.0	6.6	4	12	110	0	0	7.5	2	1.00
2	6	2	7.9	20	175	113	22.1	9.2	4	10	57	56	2.5	10.4	2	0.76
3	6	2	8.7	22	250	115	28.7	11.5	4	8	42	73	2.5	11.2	2	0.78
4	6	2	6.9	20	218	73	31.6	16.4	4	14	51	22	0.7	7.6	2	0.91
5	6	1	5.3	13	195	99	36.8	7.9	4	17	130	-31	-0.8	4.5	1	1.18
6	6	2	11.7	25	280	150	24.0	10.0	4	20	120	30	1.3	13.0	2	0.90
7*	3	1	5.6	1	145	15	26.0	4.0	3	3	45	-30	-1.2	4.4	1	1.27
8*	3	2	6.5	4	260	30	40.0	8.0	3	4	30	0	0	6.5	2	1.00
9*	3	1	6.0	4	235	20	39.2	12.0	3	4	20	0	0	6.0	1	1.00
10*	3	1	4.9	4	250	30	51.0	8.0	3	3	23	7	0.1	5.0	1	0.98
11	3	2	8.5	14	300	70	35.0	12.0	4	26	130	-60	-1.7	6.9	2	1.24
12*	3	1	4.5	4	250	15	55.6	16.0	3	4	15	0	0	4.5	1	1.00
13	3	2	8.7	20	200	180	23.0	6.7	4	22	197	-17	-0.7	8.0	2	1.09
14	6	1	5.3	13	180	70	34.0	11.1	4	12	65	5	0.2	5.5	1	0.97
15	6	2	8.6	29	210	115	24.4	15.1	4	24	95	20	0.8	9.4	2	0.91
16	6	1	4.9	18	190	120	38.8	9.0	4	13	87	33	0.8	5.7	1	0.86
17	6	2	7.9	16	380	75	48.2	12.8	4	6	28	47	1.0	8.9	2	0.89
18	6	1	5.4	14	195	70	36.2	12.0	4	2	20	50	1.4	6.8	1	0.79
19	6	2	8.6	11	287	73	33.4	9.1	4	2	13	60	1.8	10.4	2	0.83
20	3	3	10.1	28	263	187	26.0	9.0	4	3	20	167	6.4	16.5	3	0.61
21	3	2	7.8	32	250	125	32.0	15.4	4	6	23	102	3.2	11.0	2	0.71
22	6	2	8.2	25	345	120	42.1	12.5	4	14	67	53	1.3	9.5	2	0.86
23	6	2	4.7	30	230	141	49.0	12.8	4	18	85	56	1.1	5.8	2	0.81
Total	-	39	164.3	379	5,648	2,116	-	-	-	247	1,473	643	20.7	185.0	39	21.35

* To be re-assigned to Eastern I District

** (3) Florida Ave. Incinerator; (4) N. O. East Incinerator (6) Gentilly Dump

TABLE A-37

ANALYSIS OF REFUSE COLLECTION AND HAUL

District: ALGIERS and NIGHT Collection Day: SATURDAY No. of Trucks per Day: 8

PRESENT OPERATION - 3 Incinerators and 2 Dumps									FUTURE OPERATION - 5 Incinerators							
Route No.	Disp. Point **	No. of Loads	Tons Collec.	Total Haul Mileage	Minutes Per Day		Min. Per Ton of Collec.	Aver. Travel Speed (mph)	Disp. Point **	Adjusted Haul		Addit. Time for Collec. (min.)	Tons/Day		No. of Loads	Trucks Req'd. to Serve Area
					Collec.	Haul				Miles	Min.		Addit.	Total		
							ALGIERS									
1	1	2	6.1	10	150	50	24.6	12.0	1	10	50	0	0	6.1	2	1.00
2	1	2	4.6	9	170	26	37.0	20.8	1	8	23	3	0.1	4.7	2	0.98
3	1	2	5.9	8	185	55	31.4	8.7	1	5	35	20	0.6	6.5	2	0.90
4	1	2	5.3	6	189	90	35.7	4.0	1	6	90	0	0	5.3	2	1.00
5	1	1	5.2	3	180	39	34.6	9.2	1	3	39	0	0	5.2	1	1.00
6	1	2	7.0	6	183	50	26.2	7.2	1	5	42	8	0.3	7.3	2	0.96
7	1	2	3.5	7	145	35	41.4	12.0	1	6	30	5	0.1	3.6	2	0.97
8	1	2	6.2	4	243	29	39.2	8.3	1	6	43	-14	-0.4	5.8	2	1.06
Total	-	15	43.8	53	1,445	374	-	-	-	49	352	22	0.7	44.5	15	7.87
							NIGHT									
1	2	2	8.5	10	235	40	27.7	15.0	2	11	44	- 4	-0.1	8.4	2	1.02
2	2	2	8.0	12	200	45	25.0	16.0	2	12	45	0	0	8.0	2	1.00
3	2	2	7.6	13	195	105	25.7	7.4	2	12	97	8	0.3	7.9	2	0.96
4	2	2	7.4	4	150	60	20.2	4.0	2	4	60	0	0	7.4	2	1.00
5	2	2	7.2	6	200	40	27.8	9.0	2	6	40	0	0	7.2	2	1.00
6	2	3	8.1	15	310	75	38.3	12.0	2	15	75	0	0	8.1	3	1.00
7	2	2	7.9	10	190	70	24.0	8.6	2	9	63	7	0.3	8.2	2	0.96
8	2	2	7.6	4	180	30	23.7	8.0	2	4	30	0	0	7.6	2	1.00
Total	-	17	62.3	74	1,660	465	-	-	-	73	454	3	0.5	62.8	17	7.94

** (1) Algiers Incinerator; (2) 7th Street Incinerator

Form No. RS-1 New Orleans - Rf. Survey Form

Master Plan for Solid Waste Collection and Disposal
Orleans - St. Bernard - Jefferson Parish, Louisiana
D01-SW-00063-01A1
Collection and Disposal Records for Orleans Parish

DAILY ROUTE LOG Date______________

Collection: (Circle collection day) M-W-F T-Th-S Nightly

Division______________ Section____________ Route No._______

Driver (Name)___________ Collectors (Names)_________ & ________

Truck No.______________ Garage Location____________________

Leave Garage: Mileage Out____________ Time Out____

Return Garage: Mileage In____________ Time In____

Total Miles Total Minutes

		LOAD RECORD				
DRIVER'S RECORD		1st Load	2nd Load	3rd Load	4th Load	
Start Collection:	Location					
	Mileage					
	Time					
Finish Collection:	Location					
	Mileage					
	Time					
Arrive Disposal:	Location					
	Mileage					
	Time					
SCALEMAN'S RECORD						
Weight						
Leave Disposal:	Time					

Form No. RS-2

METROPOLITAN NEW ORLEANS WASTE STUDY

COLLECTION ROUTE - HAUL STUDY

DAY GRP	DAY	WEEK	DIS-TRICT	RT. NO.	PT. DISP.	TRK. TYPE	TRK. CAP.	EXISTING TRAVEL		CONSTANT COLLECTION		EXISTING HAUL		EXISTING		ADJ. T&H MI.	AVG. T/L	COLL. MIN/T	MPH T&H	ADJ. T&H MIN.	ADJUSTMENT TOTAL ROUTE	
								MI.	MIN.	MI.	MIN.	MI.	MIN.	TONS COLL.	NO. LOADS						MI.	MIN.
1	2	3	4	5-6	7	8	9-10	11-12	13-14	15-16	17-19	20-21	22-23	24-26	27	28	A	B	C	D	E	F

APPENDIX III Incinerator Maintenance Schedule

The following Model Incinerator Maintenance Schedules have been prepared as a guide to good maintenance procedures. While certain modifications may be required to adapt them to the specific plants conditions they will nevertheless provide a sound basis for developing an adequate maintenance program.

CONTINUOUS FEED PLANT

A Daily

1. Lubrication - Grease and/or oil
   - (a) Crane bucket bearings
   - (b) Stoker bearings
   - (c) Stoker drive chain
   - (d) Recirculation water pumps
   - (e) Induced draft fan bearings
   - (f) Mechanical dust collector discharge mechanism
   - (g) Air compressors
   - (h) Residue conveyor and/or grate bearings
   - (i) Residue truck motor and hoist mechanism
2. Inspect, clean, and adjust
   - (a) Crane operation
   - (b) Water cooled charge chute
   - (c) Stoker drives
   - (d) Stoker shaft, fan bearing, etc. water cooling systems

(e) Fans - forced draft, wall cooling, induced draft

(f) Water sprays and spray piping systems

(g) Compressed air system

(h) Instruments and controls - replace daily instrument charts and fill ink reservoirs

(i) Hydraulic systems

(j) Flyash handling and waste water systems

(k) Combustion air ductwork, gates, flexible connection, nozzles, etc.

(l) Furnace siftings systems

B Weekly

1. Lubrication - Grease and Oil

   (a) Crane wheel bearings - bridge and trolley

   (b) Stoker drive mechanism

   (c) Induced draft fan variable speed rive oil level

2. Inspect, clean, adjust, and repair

   (a) Crane cables

   (b) Crane brakes

   (c) Stoker chain tension adjustment

   (d) Grate castings, chains, pinions, fastenings, etc.

   (e) Water cooled charge chute - internal

   (f) Slag and repair all refractories

(g) Clean, inspect and repair cooling and/or flyash chambers and dust control equipment

(h) Waste water handling and treatment system

(i) Air and water nozzles and openings

(j) Instrumentation sampling openings, thermocouples, and controls

(k) Induced draft fan housing and impellers

(l) Adjust residue conveyor chain tension

C Monthly

1. Inspect, clean, adjust and repair

(a) Stoker chains and sprockets

(b) Fan drive belts

(c) Packing glands in pumps, shaft bearings, etc.

(d) Compressor drive belts

(e) Replace monthly strip charts

(f) Inspect and clean out truck scale pit

D Tri-Monthly

(a) Inspect and adjust stoker drive mechanism

(b) Inspect, adjust, lubricate and calibrate all instruments - to be performed by trained serviceman

(c) Inspect, adjust, lubricate and calibrate truck scale - to be performed by trained serviceman

(d) Replace crane cables - (assume continuous use)

E Semi-Annually

(a) Replace electrical contacts on crane

(b) Replace crane bridge and trolley brakes

(c) Change oil in crane geat boxes and lubricate, inspect, and adjust drive systems

(d) Replace crane main line conductor wheels

(e) Have crane inspected and tested by trained serviceman

(f) Replace bearing grease in large fans

(g) Inspect and lubricate all motor bearings

(h) Check balance of Induced Draft fans

(i) Check electrical transformer fluid

F Annual

(a) Replace, renovate, or refurbish hydraulic cylinders

(b) Replace, renovate, or refurbish the components of the stoker drive system

(c) Replace, renovate, or refurbish water pumps and air compressors

(d) Reline and/or repair refuse charge hoppers, residue discharge hoppers, and residue conveyor trough

(e) Change oil in induced draft fan fluid drive if used

G Bi-Annual

(a) Replace stoker sprockets on trunion bearings

- (b) Refurbish crane bucket - replace pins, rollers, sheaves, bearings, tynes, etc.
- (c) Replace crane wheel bearings
- (d) Replace and rebuild seals and bearings in fluid drive if used

BATCH FEED PLANT

A Daily

1. Lubrication - Grease and/or oil
    - (a) Crane bucket bearings
    - (b) Stoker bearings
    - (c) Charge gate bearings
    - (d) Recirculation water pumps
    - (e) Induced draft fan bearings
    - (f) Mechanical dust collector discharge mechanism
    - (g) Air compressors
    - (h) Residue conveyor and/or gate bearings
    - (i) Residue truck motor and hoist mechanism
2. Inspect, clean, and adjust
    - (a) Crane operation
    - (b) Stoker drives
    - (c) Stoker shaft, fan bearing, etc. water cooling systems
    - (d) Fans - forced draft, wall cooling, induced draft

(e) Water sprays and spray piping systems

(f) Compressed air system

(g) Instruments and controls - replace daily instrument charts and fill ink reservoirs

(h) Hydraulic systems

(i) Flyash handling and waste water systems

(j) Combustion air ductwork, gates, flexible connections, nozzles, etc.

B Weekly

1. Lubrication - Grease and Oil

   (a) Crane wheel bearings - bridge and trolley

   (b) Stoker drive mechanism

   (c) Induced draft fan variable speed drive oil level

2. Inspect, clean, adjust, and repair

   (a) Crane cables

   (b) Crane brakes

   (c) Charge door refractories and mechanism

   (d) Grate castings, chains, pinions, fastenings, etc.

   (e) Slag and repair all refractories

   (f) Clean, inspect and repair cooling and/or flyash chambers and dust control equipment

   (g) Waste water handling and treatment system

   (h) Air and water nozzles and openings

(i) Instrumentation sampling openings, thermocouples, and controls

(j) Induced draft fan housing and impellers

(k) Adjust residue conveyor chain tension

C Monthly

1. Inspect, clean, adjust and repair

(a) Fan drive belts

(b) Packing glands in pumps, shaft bearings, etc.

(c) Compressor drive belts

(d) Replace monthly strip charts

(e) Inspect and clean out truck scale pit

D Tri-Monthly

E Semi-Annually

F Annually

G Bi-Annually

(All same as for CONTINUOUS FEED PLANT)

APPENDIX IV Basic Field Information Forms Utilized in Survey

1. Survey of Solid Waste Production
2. Follow-up Letter
3. Daily Route Log
4. Route Log Summation

January 8, 1968

SOLID WASTE PROGRAM FOR METROPOLITAN NEW ORLEANS

SURVEY OF SOLID WASTE PRODUCTION

1. **Company:** Mason-Rust
Address: P. O. Box 29000
Individual: Clyde H. Gordon
Title: Div. Mgr. - Plant Engineering

2. Estimate Amount of Refuse

Daily 60
Weekly 300

Check one (1):

Lbs
Tons X
Cubic Feet
Cubic Yards

3. What Does Your Refuse Consist of?
Indicate (1), (2), (3) .... etc. in order of decreasing quantities:

Paper 1
Cardboard 2
Rubber
Plastics 4
Metals
Food Waste 5
Other (describe)

Cloth
Leather
Glass
Cartons
Wood 3

4. **Method of Disposal:**

Municipal Collection
Private Contractor Collection
Hauled By Own Trucks. Where? Landfill on site
On-Site Incineration

5. How Often is Your Refuse Collected:

5 Times a week
Times a month
8/trips/day Other

6. **Data on Your Present Refuse Collector:**

Company Name Mason-Rust (Ourselves)
Address P. O. Box 29000
Telephone 255-2642

USE THE ENCLOSED POSTAGE PAID BUSINESS REPLY ENVELOPE.....

THANK YOU

March 5, 1968

National Aeronautics and Space Administration
Michoud Operations
P. O. Box 26078
New Orleans, Louisiana

RE: Metropolitan Solid Waste Program

Gentlemen:

The Chamber of Commerce of the New Orleans Area, assisting us in contacting local industry earlier this year, directed a questionnaire on solid waste disposal to your office. Not having received your reply as yet we are following up by means of this second request.

We have attached a copy of the original request and questionnaire and ask your cooperation in providing the desired information. Please mail your reply to the Chamber of Commerce today.

Very truly yours,

SWITZER/GREENLEAF

Enclosures

APPENDIX V Suggested Regulations for Sanitary Landfills

SECTION 1 SANITARY LANDFILL SITES

1.1 Location

All refuse disposal site locations shall conform to applicable State laws and county or municipal zoning laws and ordinances.

1.2 Flooding

Sites subject to flooding should be avoided, if possible. Sites located in areas which may be subject to flooding shall be protected by impervious dikes. Pumping facilities shall be provided for removal of seepage and surface waters.

SECTION 2 SITE APPROVAL

Sanitary landfill sites shall conform with the general requirements contained in Section 1. In addition, the following requirements shall apply:

2.1 Subsoils

The subsoil structure shall be such that there is reasonable assurance that leachate from the landfill will not contaminate the ground waters or streams in the area, or that suitable procedures to prevent such contamination will be followed.

2.2 Grading

The surface contour of the area shall be such that surface run-off will not flow into or through the operational or completed fill area. Grading, diking, terracing, diversion ditches, or tiling may be approved when practical.

2.3 Water Table

Areas having high ground water tables may be restricted to landfill operations which will maintain a safe verticle distance between deposited refuse and the maximum water table elevation. Any operation which proposes to deposit refuse within or near the maximum water table elevation shall include corrective or preventive measures which will prevent contamination of the ground water stratum. Monitoring facilities may be required.

SECTION 3 SITE IMPROVEMENT

The following physical improvements shall be made before a landfill site is placed in operation:

3.1 The site shall be adequately fenced, with an entrance gate that can be locked and posted. Opening and closing hours and days of operation shall be clearly shown.

3.2 All-weather operational road(s) shall be provided for vehicular movement within the site. Separate operational areas may be operated within the site to allow for wet or dry weather operation and access. When necessary, to prevent dust nuisance, operational roads within the site shall be surfaced or treated.

3.3 A shelter, convenient for use by operating personnel, shall be furnished. The shelter shall be screened and provided with heating facilities and adequate lighting. Provisions shall also be made for safe drinking water and sanitary hand-washing and toilet facilities.

SECTION 4 FIRE PROTECTION

Arrangements shall be made for fire protection services when a fire protection district or other public fire protection service is available. When such a service is not available, practical alternate arrangements shall be made.

4.1 Burning material, or any refuse at a temperature likely to cause fire shall not be deposited in the fill. Said material may be deposited in a separate location a sufficient distance from the fill to prevent fires from spreading to the normal fill area and shall be immediately covered with a sufficient amount of earth to extinguish same.

SECTION 5 SANITARY LANDFILL OPERATION

5.1 Site Access

Access to the site shall be permitted only during the hours when operating personnel are on the site.

5.2 Dumping Area

Dumping of refuse on the site shall be confined to the smallest practical area.

5.3 Unloading

Unloading shall be supervised. Portable fences shall be used when necessary to prevent blowing litter from the unloading site. The fill and surrounding area shall be policed as necessary to collect all scattered material.

5.4 Equipment

Sufficient equipment in operational condition shall be available at the site at all times to permit operation of the landfill according to the approved plan.

5.5 Spreading and Compacting of Refuse

As rapidly as refuse is admitted to the site, it shall be spread and compacted in shallow layers of approximately two to three feet in compacted depth depending upon the type of material and the compaction equipment. The completed cell shall consist of the refuse admitted and compacted during one working day, regardless of overall height and area covered.

5.6 Cover

Cover material shall be of such quality as to prevent fly and rodent attraction and breeding, blowing litter, release of odors, fire hazards, and unsightly appearance, and which will permit only minimal percolation of surface water or cracking when properly compacted. Cover shall be applied as follows:

5.61 Daily Cover: A compacted layer of at least six (6) inches of material shall be used to cover all exposed refuse at the end of each working day; except that on surfaces that will not receive an additional depth of refuse or the final cover within 60 days, a compacted layer of cover of at least one (1) foot shall be applied.

5.62 Final Cover: A compacted layer of at least two (2) feet of material in addition to the daily cover shall be placed over the entire surface of all completed portions of the fill within six (6) months following the final placement of refuse. Final cover shall be graded as provided on the approved plan and to prevent ponding. The surface of the final cover shall be maintained at the plan elevation at all times, by the placement of additional cover material where necessary.

5.7 Deposition of Liquids and Hazardous Materials

Sewage solids or liquids, septic tank pumpings, and other liquids or hazardous substances shall not be discharged to a sanitary landfill until written approval has been obtained from the Department. Special provisions may vary from site to site depending upon local conditions, and will be specified in the approval letter.

5.8 Vector Control

Insect and rodent control measures shall be employed as directed by the Department.

5.9 Sanitary Landfill Variation

Large quantities of non-combustible and non-putrescible waste such as boilerhouse cinders, broken paving, or materials resulting from construction or demolition operations may be disposed of at a sanitary landfill by open dumping. Such material shall be leveled and spread at sufficient intervals to prevent unsightly appearance or rodent harborage, and shall be finally covered as required for a completed sanitary landfill in Rule 5.07, unless approved plan provides for other cover.

5.10 Prohibited Activities

The following activities shall be prohibited in conjunction with, or upon the site of the sanitary landfill.

5.101 All scavenging operations. Scavenging shall mean the manual sorting of refuse, either in the trucks, at the face of the fill, or in unconfined truck discharge areas.

5.102 All feeding of farm or domestic animals.

5.103 Deposition of refuse in

5.104 Burning, except in an approved incinerator.

APPENDIX VI Refuse Sampling and Testing Procedures

Refuse sampling was performed daily at Florida Avenue Incinerator over a five-day period January 22 through 26, 1968. These samples were taken from well-mixed refuse in the storage pit. The method consisted of removing about a two-cubic yard sample from the pit via the overhead crane and bucket and depositing the contents on a plastic sheet on the charging floor. Here the sample was mixed and quartered to obtain a working size sample of about 25 gallons. The working size samples were:

1. Weighed for gross weight.
2. Physical components were separated and weighed individually.
3. Percentile composition of each component was calculated.
4. Air drying of the samples was conducted for a period of two to three weeks.
5. Re-weighing of the components was performed.
6. Each component of the laboratory sample was oven-dried for further moisture determination; (testing was performed by Shilstone Testing Laboratory in New Orleans).
7. Total moisture content (weight loss) was calculated on the typical sample (average composition five-day period) as shown in Table V-26, page V-51.

During the sampling period extremely dry weather conditions prevailed and relatively no rain occurred during the week preceeding the sampling period, so an extremely dry refuse was handled.

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PROJECTED COST OF THE TRI-PARIS

(BASED ON 196

	1971	1972	1973	1974	1975	1976	
ST. BERNARD PARISH							
Waste Produced	34,500	36,500	38,500	40,500	42,500	45,000	
Waste Transferred							
TOTAL Waste for Disposal	34,500	36,500	38,500	40,500	42,500	45,000	
Existing Incinerator - Effective Cap.	28,000	28,000	28,000	28,000	28,000	28,000	
Capacity Utilized	10,000	10,000	10,000	10,000	10,000	10,000	
Capital Cost $39,000 + Operating Cost	$ 83,000	$ 83,000	$ 83,000	$ 83,000	$ 83,000	$ 83,000	$
Cost per Ton Incinerated	$ 8.30	$ 8.30	$ 8.30	$ 8.30	$ 8.30	$ 8.30	$
Waste Disposal by Sanitary Landfill	24,500	26,500	28,500	30,500	32,500	35,000	
Annual Cost @ $4.50 per Ton	$110,000	$119,000	$128,000	$137,000	$146,000	$157,000	$1
Proposed Incinerator - Effective Cap.	—	—	—	—	—	—	
Capacity Utilized	—	—	—	—	—	—	
Capital Cost $212,000 + Operating Cost	—	—	—	—	—	—	
Cost per Ton Incinerated	—	—	—	—	—	—	
TOTAL Annual Disposal Cost	$193,000	$202,000	$211,000	$220,000	$229,000	$240,000	$25
Overall Disposal Cost per Ton	$ 5.60	$ 5.54	$ 5.46	$ 5.43	$ 5.40	$ 5.33	$
ORLEANS PARISH - Eastern I							
Waste Produced	118,000	127,000	136,000	145,000	154,000	157,000	16
Waste Transferred	+52,000	+43,000					
TOTAL Waste for Disposal	170,000	170,000	136,000	145,000	154,000	157,000	16
Florida Ave. Incin. - Effective Cap.	170,000	170,000	170,000	170,000	170,000	170,000	17
Capacity Utilized	170,000	170,000	136,000	145,000	154,000	157,000	16
Capital Cost $313,800 + $266,000 (1) + Operating Cost	$620,000	$620,000	$620,000	$620,000	$620,000	$620,000	$620
Cost per Ton Incinerated	$ 3.65	$ 3.65	$ 4.55	$ 4.28	$ 4.03	$ 3.95	$
TOTAL Annual Disposal Cost	$431,000	$463,000	$620,000	$620,000	$620,000	$620,000	$620
Overall Disposal Cost per Ton	$ 3.65	$ 3.65	$ 4.55	$ 4.28	$ 4.03	$ 3.95	$
ORLEANS PARISH - Eastern II							
Waste Produced	90,000	96,000	71,000	77,000	83,000	89,000	95
Waste Transferred	+ 23,000	+ 17,000					
TOTAL Waste for Disposal	113,000	113,000	71,000	77,000	83,000	89,000	95
New Orleans East Incin. #1 - Effective Cap.	113,000	113,000	113,000	113,000	113,000	113,000	113
Capacity Utilized	113,000	113,000	71,000	77,000	83,000	89,000	95
Capital Cost $167,000 + Operating Cost	$397,000	$397,000	$317,000	$317,000	$317,000	$397,000	$397
Cost per Ton Incinerated	$ 3.52	$ 3.52	$ 4.47	$ 4.12	$ 3.82	$ 4.50	$
Waste Disposal by Sanitary Landfill	—	—	—	—	—	—	—
Annual Cost @ $4.50 per Ton	—	—	—	—	—	—	—
New Orleans East Incin. #2 - Effective Cap.	—	—	—	—	—	—	—
Capacity Utilized	—	—	—	—	—	—	—
Capital Cost $212,000 + Operating Cost	—	—	—	—	—	—	—
Cost per Ton Incinerated	—	—	—	—	—	—	—
TOTAL Annual Disposal Cost	$316,000	$337,000	$317,000	$317,000	$317,000	$397,000	$397,
Overall Disposal Cost per Ton	$ 3.52	$ 3.52	$ 4.47	$ 4.12	$ 3.82	$ 4.50	$ 4
ORLEANS PARISH - Night & Central							
Waste Produced	148,500	150,000	174,000	176,000	178,000	180,000	183,0
Waste Transferred	- 88,000	-71,000		+ 4,000			
TOTAL Waste for Disposal	60,500	79,000	174,000	180,000	178,000	180,000	183,0
Seventh Street Incinerator - Effective Cap.	—	—	256,000	256,000	256,000	256,000	256,0
Capacity Utilized	—	—	174,000	180,000	178,000	180,000	183,0
Capital Cost $78,300 + $398,000 (1) + Operating Cost	—	—	$736,300	$736,300	$736,300	$736,300	$911,3
Cost per Ton Incinerated	—	—	$ 4.23	$ 4.09	$ 4.15	$ 4.09	$ 4.
Waste Disposal by Sanitary Landfill	60,500	79,000	—	—	—	—	—
Annual Cost @ $4.50 per Ton	272,000	355,000	—	—	—	—	—
TOTAL Annual Disposal Cost	$576,200	$600,000	$736,300	$720,000	$736,300	$736,300	$911,30
Overall Disposal Cost per Ton	$ 3.85	$ 4.00	$ 4.23	$ 4.09	$ 4.15	$ 4.09	$
ORLEANS PARISH - Western							
Waste Produced	115,000	117,000	95,000	97,000	99,000	100,500	102,0
Waste Transferred	+13,000	+ 11,000					
TOTAL Waste for Disposal							

B

TABLE VII-3

OF THE TRI-PARISH SOLID WASTE DISPOSAL PROGRAM 1971 - 1990

(BASED ON 1967 COST) (TONS/YEAR)

1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
40,500	42,500	45,000	47,500	50,000	52,500	55,500	58,000	60,500	63,000	66,000	69,000	72,000	75,500
						+15,000	+19,000	+24,000	+36,000	+47,000	+44,000	+41,000	+37,500
40,500	42,500	45,000	47,500	50,000	52,500	70,500	77,000	84,000	99,000	113,000	113,000	113,000	113,000
28,000	28,000	28,000	28,000	28,000	28,000	—	—	—	—	—	—	—	—
10,000	10,000	10,000	10,000	10,000	10,000	—	—	—	—	—	—	—	—
83,000	$ 83,000	$ 83,000	$ 83,000	$ 83,000	$ 83,000	—	—	—	—	—	—	—	—
8.30	$ 8.30	$ 8.30	$ 8.30	$ 8.30	$ 8.30	—	—	—	—	—	—	—	—
30,500	32,500	35,000	37,500	40,000	42,500	—	—	—	—	—	—	—	—
37,000	$146,000	$157,000	$168,000	$180,000	$191,000	—	—	—	—	—	—	—	—
—	—	—	—	—	—	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000
—	—	—	—	—	—	70,500	77,000	84,000	99,000	113,000	113,000	113,000	113,000
—	—	—	—	—	—	$366,000	$366,000	$442,000	$442,000	$442,000	$442,000	$442,000	$442,000
—	—	—	—	—	—	$ 5.18	$ 4.76	$ 5.26	$ 4.42	$ 3.92	$ 3.92	$ 3.92	$ 3.92
0,000	$229,000	$240,000	$251,000	$263,000	$274,000	$290,000	$276,000	$318,000	$278,000	$259,000	$271,000	$283,000	$287,000
5.43	$ 5.40	$ 5.33	$ 5.29	$ 5.27	$ 5.22	$ 5.18	$ 4.77	$ 5.26	$ 4.42	$ 3.92	$ 3.92	$ 3.92	$ 3.92
5,000	154,000	157,000	160,000	163,000	166,000	170,000	174,000	178,000	182,000	188,000	193,000	196,000	199,500
						-15,000	-11,000	- 8,000	-12,000	-18,000	- 23,000	- 26,000	-29,500
5,000	154,000	157,000	160,000	163,000	166,000	155,000	163,000	170,000	170,000	170,000	170,000	170,000	170,000
0,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000
5,000	154,000	157,000	160,000	163,000	166,000	155,000	163,000	170,000	170,000	170,000	170,000	170,000	170,000
0,000	$620,000	$620,000	$620,000	$572,000	$572,000	$572,000	$572,000	$572,000	$572,000	$572,000	$572,000	$572,000	$572,000
4.28	$ 4.03	$ 3.95	$ 3.87	$ 3.52	$ 3.46	$ 3.69	$ 3.52	$ 3.37	$ 3.37	$ 3.37	$ 3.37	$ 3.37	$ 3.37
0,000	$620,000	$620,000	$620,000	$620,000	$620,000	$697,000	$625,000	$614,000	$625,000	$642,000	$662,000	$674,000	$688,000
4.28	$ 4.03	$ 3.95	$ 3.87	$ 3.80	$ 3.74	$ 4.10	$ 3.58	$ 3.45	$ 3.44	$ 3.40	$ 3.44	$ 3.44	$ 3.44
,000	83,000	89,000	95,000	101,000	107,000	113,000	121,000	129,000	137,000	145,000	153,000	161,000	169,000
							- 8,000	-16,000	- 24,000	-29,000	-21,000	-15,000	- 8,000
,000	83,000	89,000	95,000	101,000	107,000	113,000	113,000	113,000	113,000	116,000	132,000	146,000	161,000
,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000
,000	83,000	89,000	95,000	101,000	107,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000
000	$317,000	$397,000	$397,000	$397,000	$397,000	$397,000	$397,000	$397,000	$397,000	$397,000	$397,000	$397,000	$397,000
4.12	$ 3.82	$ 4.50	$ 4.03	$ 3.80	$ 3.58	$ 3.52	$ 3.52	$ 3.52	$ 3.52	$ 3.52	$ 3.52	$ 3.52	$ 3.52
—	—	—	—	—	—	—	—	—	—	3,000	19,000	33,000	48,000
—	—	—	—	—	—	—	—	—	—	$ 13,500	$ 86,000	$149,000	$216,000
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
000	$317,000	$397,000	$397,000	$397,000	$397,000	$397,000	$435,000	$481,000	$503,000	$524,000	$566,000	$604,000	$645,000
.12	$ 3.82	$ 4.50	$ 4.03	$ 3.80	$ 3.58	$ 3.52	$ 3.58	$ 3.74	$ 3.66	$ 3.61	$ 3.70	$ 3.74	$ 3.80
000	178,000	180,000	183,000	186,000	189,000	192,000	196,000	200,000	204,000	208,000	212,000	216,000	220,000
000					+16,000	+39,000	+53,000	+56,000	+52,000	+48,000		+ 6,000	
000	178,000	180,000	183,000	186,000	205,000	231,000	249,000	256,000	256,000	256,000	212,000	222,000	220,000
00	256,000	256,000	256,000	256,000	256,000	256,000	256,000	256,000	256,000	256,000	256,000	256,000	256,000
00	178,000	180,000	183,000	186,000	205,000	231,000	249,000	256,000	256,000	256,000	212,000	222,000	220,000
300	$736,300	$736,300	$911,300	$911,300	$911,300	$833,000	$833,000	$833,000	$833,000	$833,000	$833,000	$833,000	$833,000
09	$ 4.15	$ 4.09	$ 4.99	$ 4.90	$ 4.45	$ 3.60	$ 3.34	$ 3.26	$ 3.26	$ 3.26	$ 3.93	$ 3.74	$ 3.78
	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—
00	$736,300	$736,300	$911,300	$911,300	$844,000	$700,000	$655,000	$653,000	$665,000	$680,000	$833,000	$810,000	$833,000
09	$ 4.15	$ 4.09	$ 4.99	$ 4.90	$ 4.45	$ 3.60	$ 3.34	$ 3.26	$ 3.26	$ 3.26	$ 3.93	$ 3.74	$ 3 78
00	99,000	100,500	102,000	103,500	105,000	107,000	109,000	111,500	114,000	116,500	[illegible]		

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ASTE DISPOSAL PROGRAM 1971 - 1990

(TONS / YEAR)

C

1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
52,500	55,500	58,000	60,500	63,000	66,000	69,000	72,000	75,500	79,000	82,500	86,000
	+15,000	+19,000	+24,000	+36,000	+47,000	+44,000	+41,000	+37,500	+ 34,000	+31,000	+ 27,000
52,500	70,500	77,000	84,000	99,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000
28,000	—	—	—	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—	—	—
$ 83,000	—	—	—	—	—	—	—	—	—	—	—
$ 8.30	—	—	—	—	—	—	—	—	—	—	—
42,500	—	—	—	—	—	—	—	—	—	—	—
$191,000	—	—	—	—	—	—	—	—	—	—	—
—	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000
—	70,500	77,000	84,000	99,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000
—	$366,000	$366,000	$442,000	$442,000	$442,000	$442,000	$442,000	$442,000	$442,000	$442,000	$442,000
—	$ 5.18	$ 4.76	$ 5.26	$ 4.42	$ 3.92	$ 3.92	$ 3.92	$ 3.92	$ 3.92	$ 3.92	$ 3.92
$274,000	$290,000	$276,000	$318,000	$278,000	$259,000	$271,000	$283,000	$287,000	$310,000	$324,000	$338,000
$ 5.22	$ 5.18	$ 4.77	$ 5.26	$ 4.42	$ 3.92	$ 3.92	$ 3.92	$ 3.92	$ 3.92	$ 3.92	$ 3.92
166,000	170,000	174,000	178,000	182,000	188,000	193,000	196,000	199,500	203,000	206,500	210,000
	-15,000	-11,000	- 8,000	-12,000	-18,000	- 23,000	- 26,000	-29,500	-33,000	- 36,500	- 40,000
166,000	155,000	163,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000
170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000
166,000	155,000	163,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000
$572,000	$572,000	$572,000	$572,000	$572,000	$572,000	$572,000	$572,000	$572,000	$572,000	$572,000	$572,000
$ 3.46	$ 3.69	$ 3.52	$ 3.37	$ 3.37	$ 3.37	$ 3.37	$ 3.37	$ 3.37	$ 3.37	$ 3.37	$ 3.37
$620,000	$697,000	$625,000	$614,000	$625,000	$642,000	$662,000	$674,000	$688,000	$702,000	$714,000	$734,000
$ 3.74	$ 4.10	$ 3.58	$ 3.45	$ 3.44	$ 3.40	$ 3.44	$ 3.44	$ 3.44	$ 3.46	$ 3.46	$ 3.48
107,000	113,000	121,000	129,000	137,000	145,000	153,000	161,000	169,000	177,000	185,000	193,000
		- 8,000	-16,000	- 24,000	-29,000	-21,000	-15,000	- 8,000	- 1,000	+ 5,500	+13,000
107,000	113,000	113,000	113,000	113,000	116,000	132,000	146,000	161,000	176,000	190,500	206,000
113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000
107,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000
$397,000	$397,000	$397,000	$397,000	$397,000	$397,000	$397,000	$397,000	$397,000	$397,000	$397,000	$397,000
$ 3.58	$ 3.52	$ 3.52	$ 3.52	$ 3.52	$ 3.52	$ 3.52	$ 3.52	$ 3.52	$ 3.52	$ 3.52	$ 3.52
—	—	—	—	—	3,000	19,000	33,000	48,000	63,000	—	—
—	—	—	—	—	$ 13,500	$ 86,000	$149,000	$216,000	$284,000	—	—
—	—	—	—	—	—	—	—	—	—	113,000	113,000
—	—	—	—	—	—	—	—	—	—	77,500	93,000
—	—	—	—	—	—	—	—	—	—	$366,000	$442,000
—	—	—	—	—	—	—	—	—	—	$ 4.71	$ 4.76
$397,000	$397,000	$435,000	$481,000	$503,000	$524,000	$566,000	$604,000	$645,000	$683,000	$737,000	$777,000
$ 3.58	$ 3.52	$ 3.58	$ 3.74	$ 3.66	$ 3.61	$ 3.70	$ 3.74	$ 3.80	$ 3.85	$ 3.98	$ 4.00
189,000	192,000	196,000	200,000	204,000	208,000	212,000	216,000	220,000	224,000	228,000	232,000
+16,000	+39,000	+53,000	+56,000	+52,000	+48,000		+ 6,000			+19,000	+ 4,000
205,000	231,000	249,000	256,000	256,000	256,000	212,000	222,000	220,000	224,000	247,000	236,000
256,000	256,000	256,000	256,000	256,000	256,000	256,000	256,000	256,000	256,000	256,000	256,000
205,000	231,000	249,000	256,000	256,000	256,000	212,000	222,000	220,000	224,000	247,000	236,000
$911,300	$833,000	$833,000	$833,000	$833,000	$833,000	$833,000	$833,000	$833,000	$833,000	$833,000	$833,000
$ 4.45	$ 3.60	$ 3.34	$ 3.26	$ 3.26	$ 3.26	$ 3.93	$ 3.74	$ 3.78	$ 3.71	$ 3.38	$ 3.54
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
844,000	$700,000	$655,000	$653,000	$665,000	$680,000	$833,000	$810,000	$833,000	$833,000	$745,000	$833,000
4.45	$ 3.60	$ 3.34	$ 3.26	$ 3.26	$ 3.26	$ 3.93	$ 3.74	$ 3 78	$ 3.71	$ 3.38	$ 3.54
105,000	107,000	109,000	111,500	114,000	116,500	119,000	121,500	124,000	126,500	129,000	132,000

TOTAL Waste for Disposal	128,000	128,000	95,000	97,000	99,000	100,500	
St. Louis Incinerator - Effective Cap.	128,000	128,000	128,000	128,000	128,000	128,000	
Capacity Utilized	128,000	128,000	95,000	97,000	99,000	100,500	
Capital Cost $75,500 + Operating Cost	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$
Cost per Ton Incinerated	$ 2.55	$ 2.55	$ 3.42	$ 3.35	$ 3.28	$ 3.24	$
TOTAL Annual Disposal Cost	$293,000	$298,000	$325,000	$325,000	$325,000	$325,000	$
Overall Disposal Cost per Ton	$ 2.55	$ 2.55	$ 3.42	$ 3.35	$ 3.28	$ 3.24	$
ORLEANS PARISH - Algiers							
Waste Produced	44,000	46,000	47,000	51,000	54,000	56,000	
Waste Transferred				-4,000	+26,000	+30,000	
TOTAL Waste for Disposal	44,000	46,000	47,000	47,000	80,000	86,000	
Algiers Incinerator - Effective Cap.	47,000	47,000	47,000	47,000	140,000	140,000	
Capacity Utilized	44,000	46,000	47,000	47,000	80,000	86,000	
Capital Cost $65,700 + $160,000 (1) + $160,000 (2) + Operating Cost	$317,700	$317,700	$317,700	$317,700	$405,700	$405,700	$
Cost per Ton Incinerated	$ 7.22	$ 6.90	$ 6.75	$ 6.75	$ 5.06	$ 4.73	$
TOTAL Annual Disposal Cost	$317,700	$317,700	$317,700	$338,000	$273,000	$265,000	$
Overall Disposal Cost per Ton	$ 7.22	$ 6.90	$ 6.75	$ 6.63	$ 5.06	$ 4.73	$
ORLEANS PARISH - TOTAL							
Waste Produced	508,000	523,000	538,000	553,000	568,000	582,500	
Annual Disposal Cost	$1,931,700	$2,015,700	$2,316,000	$2,316,000	$2,242,300	$2,343,000	$2,
Overall Disposal Cost per Ton	$ 3.80	$ 3.85	$ 4.63	$ 4.50	$ 3.95	$ 4.03	$
JEFFERSON PARISH - Westbank							
Waste Produced	93,000	98,000	104,000	110,000	116,000	124,000	1
Waste Transferred	+25,000	+ 31,000	+36,000	+30,000	-26,000	-30,000	-
TOTAL Waste for Disposal	118,000	129,000	140,000	140,000	90,000	94,000	1
[illegible]na Incinerator - Effective Cap.	—	—	—	—	—	—	
Capacity Utilized	—	—	—	—	—	—	
Capital Cost $ + Operating Cost	—	—	—	—	—	—	
Cost per Ton Incinerated	—	—	—	—	—	—	
Marrero Incinerator - Effective Cap.	140,000	140,000	140,000	140,000	140,000	140,000	1
Capacity Utilized	118,000	129,000	140,000	140,000	90,000	94,000	1
Capital Cost $248,000 + $390,000 (1) + Operating Cost	$518,000	$518,000	$518,000	$518,000	$428,000	$428,000	$4
Cost per Ton Incinerated	$ 4.40	$ 4.02	$ 3.70	$ 3.70	$ 4.75	$ 4.56	$
Waste Disposal by Sanitary Landfill	—	—	—	—	—	—	
Annual Cost @ $4.50 per Ton	—	—	—	—	—	—	
TOTAL Annual Disposal Cost	$409,000	$395,000	$385,000	$407,000	$562,000	$570,000	$57
Overall Disposal Cost per Ton	$ 4.40	$ 4.02	$ 3.70	$ 3.70	$ 4.85	$ 4.58	$
JEFFERSON PARISH - Eastbank							
Waste Produced	164,000	175,000	186,000	197,500	209,000	231,000	25
Waste Transferred	-25,000	-31,000	-36,000	-30,000	—	—	
TOTAL Waste for Disposal	139,000	144,000	150,000	167,500	209,000	231,000	25
David Road Incinerator - Effective Cap.	113,000	113,000	113,000	113,000	113,000	113,000	1
Capacity Utilized	113,000	113,000	113,000	113,000	113,000	113,000	1
Capital Cost $112,000 + Operating Cost	$342,000	$342,000	$342,000	$342,000	$342,000	$342,000	$34
Cost per Ton Incinerated	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$
Le Barre Road Incinerator - Effective Cap.	—	—	—	—	170,000	170,000	17
Capacity Utilized	—	—	—	—	96,000	118,000	14
Capital Cost $283,000 + Operating Cost	—	—	—	—	$487,000	$487,000	$58
Cost per Ton Incinerated	—	—	—	—	$ 5.08	$ 4.12	$
Kenner Jefferson Incinerator - Effective Cap.	—	—	—	—	—	—	
Capacity Utilized	—	—	—	—	—	—	
Capital Cost $209,000 + Operating Cost	—	—	—	—	—	—	
Cost per Ton Incinerated	—	—	—	—	—	—	
St. Charles Sanitary Landfill	26,000	31,000	37,000	54,000	—	—	
Annual Cost @ $4.50 per Ton	$117,000	$139,500	$167,000	$245,000	—	—	
TOTAL Annual Disposal Cost	$569,000	$645,500	$642,000	$678,000	$829,000	$829,000	$93
Overall Disposal Cost per Ton	$ 3.47	$ 3.69	$ 3.46	$ 3.44	$ 3.96	$ 3.60	$
TRI-PARISH AREA - TOTAL							
Waste Produced	$799,500	$832,500	$866,500	$901,000	$935,500	$982,500	$1,03
TOTAL Cost of Disposal	$3,101,700	$3,257,700	$3,729,000	$3,795,000	$3,858,300	$3,982,300	$4,27
Overall Disposal Cost per Ton	$ 3.77	$ 3.91	$ 4.32	$ 4.21	$ 4.13	$ 4.06	$

(1) First Expansion
(2) Second Expansion

1

1

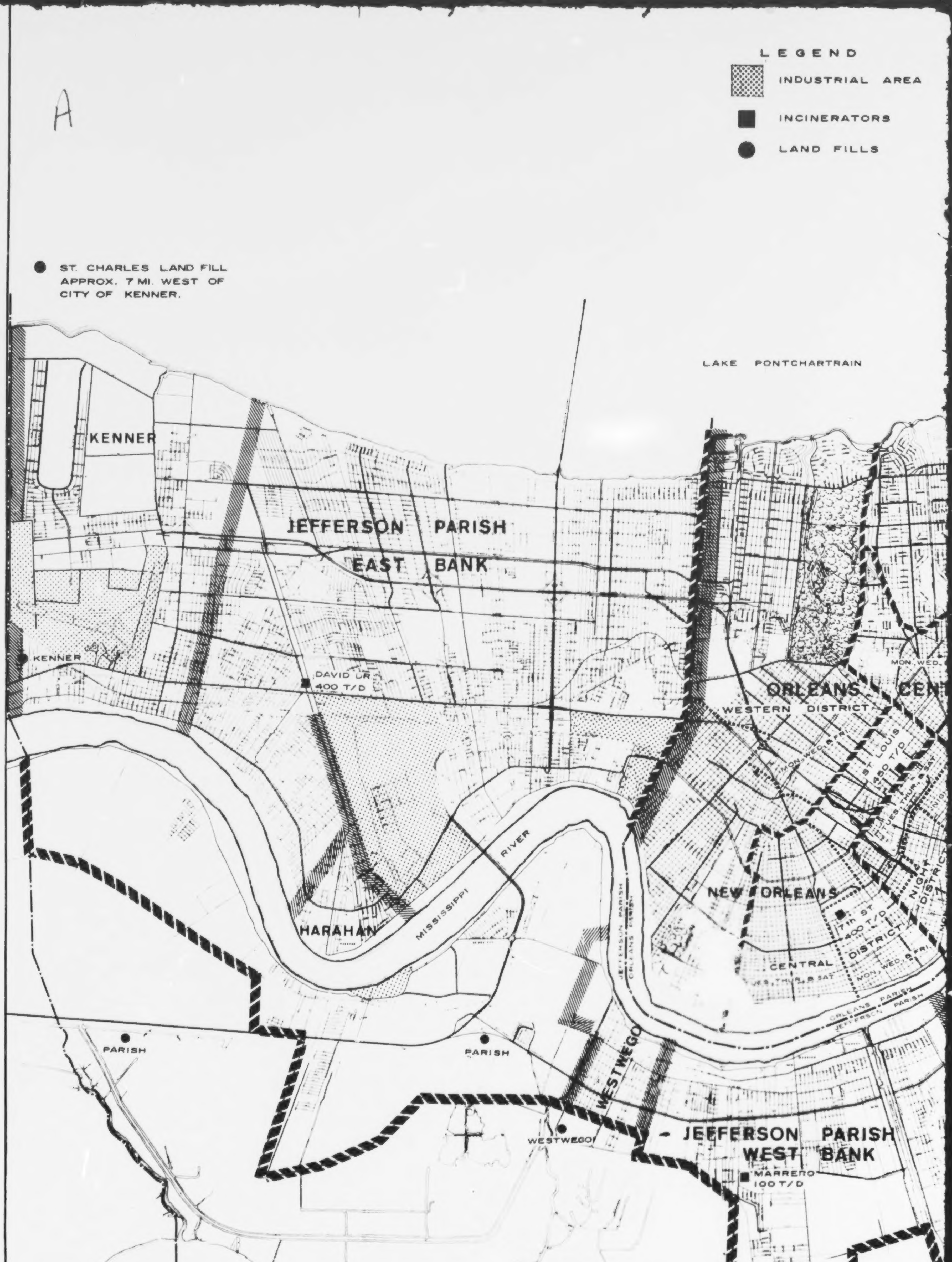
	100,500	102,000	103,500	105,000	107,000	109,000	111,500	114,000	116,500	119,000	121,500	124,000	126,500	128,
	128,000	128,000	128,000	128,000	128,000	128,000	128,000	128,000	128,000	128,000	128,000	128,000	128,000	128,
	100,500	102,000	103,500	105,000	107,000	109,000	111,500	114,000	116,500	119,000	121,500	124,000	126,500	128,
	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,
	$ 3.24	$ 3.19	$ 3.14	$ 3.10	$ 3.04	$ 2.97	$ 2.92	$ 2.87	$ 2.79	$ 2.73	$ 2.68	$ 2.63	$ 2.57	$
	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$328,
	$ 3.24	$ 3.19	$ 3.14	$ 3.10	$ 3.04	$ 2.97	$ 2.92	$ 2.87	$ 2.79	$ 2.73	$ 2.68	$ 2.63	$ 2.57	$
	56,000	58,500	61,000	62,500	66,000	69,000	72,000	75,000	78,500	82,000	87,000	92,000	97,000	102
	+30,000	+32,000	+40,000	+37,500	+34,000	+31,000	+39.500	+51,000	+62,500	+74,000	+94,000	+115,000	+66,000	+87
	86,000	90,500	101,000	100,000	100,000	100,000	111,500	126,000	141,000	156,000	181,000	207,000	163,000	189
	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	224,000	224,000	224,000	224,000	224
	86,000	90,500	101,000	100,000	100,000	100,000	111,500	126,000	141,000	156,000	181,000	207,000	163,000	189
	$405,700	$405,700	$405,700	$405,700	$405,700	$405,700	$495,700	$495,700	$495,700	$675,700	$775,700	$775,700	$775,700	$775
	$ 4.73	$ 4.49	$ 4.03	$ 4.06	$ 4.06	$ 4.06	$ 4.45	$ 3.92	$ 3.54	$ 4.34	$ 4.30	$ 3.76	$ 4.77	$
	$265,000	$263,000	$246,000	$254,000	$268,000	$280,000	$320,000	$294,000	$308,000	$356,000	$374,000	$346,000	$465,000	$423
	$ 4.73	$ 4.49	$ 4.03	$ 4.06	$ 4.06	$ 4.06	$ 4.45	$ 3.92	$ 3.54	$ 4.34	$ 4.30	$ 3.76	$ 4.77	$
	582,500	598,500	614,500	629,500	648,000	669,000	690,500	712,000	736,000	759,000	781,500	804,500	827,500	851
	$2,343,000	$2,516,300	$2,499,300	$2,440,300	$2,387,500	$2,320,000	$2,393,500	$2,412,000	$2,479,000	$2,742,000	$2,787,000	$2,837,000	$3,008,000	$2,94
	$ 4.03	$ 4.20	$ 4.07	$ 3.87	$ 3.70	$ 3.47	$ 3.47	$ 3.39	$ 3.37	$ 3.61	$ 3.57	$ 3.53	$ 3.64	$
	124,000	132,000	140,000	148,000	157,000	168,000	179,500	191,000	202,500	214,000	234,000	255,000	276,000	297
	-30,000	-32,000	-40,000	-37,500	-34,000	-31,000	-39,500	-51,000	-62,500	-74,000	-94,000	-115,000	-66,000	-87
	94,000	100,000	100,000	110,500	123,000	137,000	140,000	140,000	140,000	140,000	140,000	140,000	210,000	210
	—	—	—	—	—	—	—	—	—	—	—	—	—	
	—	—	—	—	—	—	—	—	—	—	—	—	—	
	—	—	—	—	—	—	—	—	—	—	—	—	—	
	—	—	—	—	—	—	—	—	—	—	—	—	—	
	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	210,000	210
	94,000	100,000	100,000	110,500	123,000	137,000	140,000	140,000	140,000	140,000	140,000	140,000	210,000	210
	$428,000	$428,000	$428,000	$518,000	$518,000	$518,000	$518,000	$518,000	$518,000	$518,000	$518,000	$518,000	$760,000	$760
	$ 4.56	$ 4.28	$ 4.28	$ 4.51	$ 4.21	$ 3.78	$ 3.70	$ 3.70	$ 3.70	$ 3.70	$ 3.70	$ 3.70	$ 3.62	$
	—	—	—	—	—	—	—	—	—	—	—	—	—	
	—	—	—	—	—	—	—	—	—	—	—	—	—	
	$570,000	$572,000	$589,000	$652,000	$656,000	$644,000	$694,000	$718,000	$740,000	$839,000	$923,000	$951,000	$1,074,000	$1,11
	$ 4.58	$ 4.33	$ 4.20	$ 4.31	$ 4.18	$ 3.83	$ 3.85	$ 3.76	$ 3.61	$ 3.90	$ 3.93	$ 3.73	$ 3.88	$
	231,000	253,000	276,000	299,000	322,000	333,000	344,500	356,000	367,500	379,000	402,000	425,000	448,000	47
	—	—	—	-16,000	-39,000	-53,000	-56,000	-52,000	-48,000	—	- 6,000	—	—	-1
	231,000	253,000	276,000	283,000	283,000	280,000	288,500	304,000	319,500	379,000	396,000	425,000	448,000	45
	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	11
	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	11
	$342,000	$342,000	$342,000	$342,000	$342,000	$342,000	$342,000	$342,000	$342,000	$342,000	$342,000	$342,000	$342,000	$34
	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$
	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	17
	118,000	140,000	163,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	142,000	165,000	17
	$487,000	$589,000	$589,000	$589,000	$589,000	$589,000	$589,000	$589,000	$589,000	$589,000	$589,000	$589,000	$589,000	$58
	$ 4.12	$ 4.20	$ 3.61	$ 3.46	$ 3.46	$ 3.46	$ 3.46	$ 3.46	$ 3.46	$ 3.46	$ 3.46	$ 4.15	$ 3.56	$
	—	—	—	—	—	—	—	—	—	113,000	113,000	170,000	170,000	17
	—	—	—	—	—	—	—	—	—	96,000	113,000	170,000	170,000	17
	—	—	—	—	—	—	—	—	—	$442,000	$442,000	$631,000	$631,000	$63
	—	—	—	—	—	—	—	—	—	$ 4.62	$ 3.91	$ 3.71	$ 3.71	$
	—	—	—	—	—	—	5,000	21,000	36,500	—	—	—	—	
	—	—	—	—	—	—	$ 22,500	$ 95,000	$165,000	—	—	—	—	
0	$829,000	$931,000	$931,000	$1,002,200	$1,071,000	$1,109,000	$1,135,000	$1,196,000	$1,243,000	$1,373,000	$1,395,000	$1,562,000	$1,562,000	$1,6
6	$ 3.60	$ 3.69	$ 3.37	$ 3.55	$ 3.34	$ 3.29	$ 3.29	$ 3.36	$ 3.39	$ 3.62	$ 3.40	$ 3.69	$ 3.48	$
0	$982,500	$1,031,000	$1,080,500	$1,129,000	$1,182,500	$1,228,000	$1,275,000	$1,322,000	$1,372,000	$1,421,000	$1,489,500	$1,560,000	$1,630,000	$1,7
0	$3,982,300	$4,270,300	$4,282,300	$4,369,300	$4,404,500	$4,349,000	$4,540,500	$4,604,000	$4,721,000	$5,225,000	$5,388,000	$5,637,000	$5,954,000	$6,0
3	$ 4.06	$ 4.14	$ 3.96	$ 3.88	$ 3.72	$ 3.55	$ 3.55	$ 3.48	$ 3.44	$ 3.67	$ 3.63	$ 3.63	$ 3.66	$

F

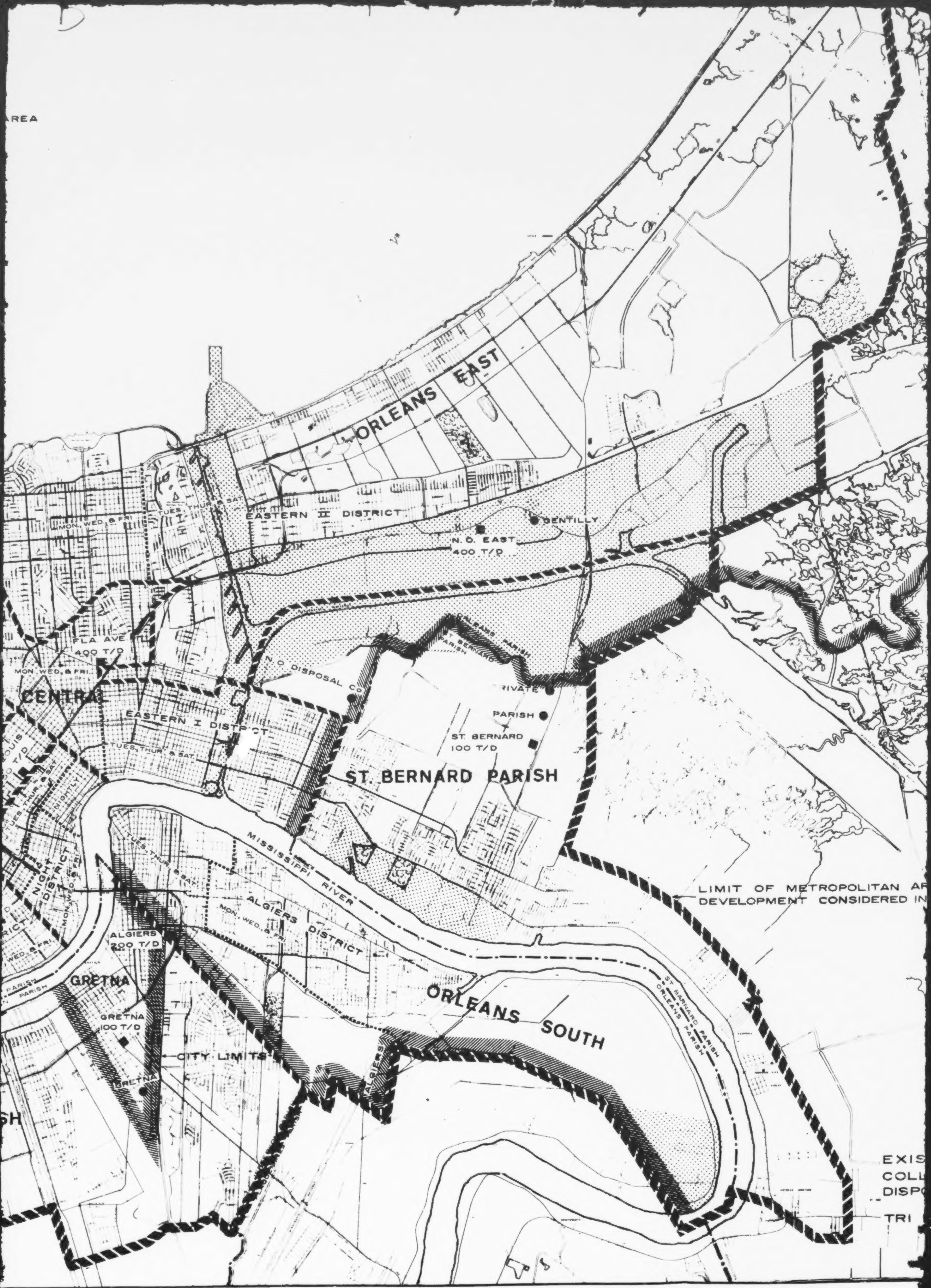
		[illegible]	[illegible]	128,000	128,000	128,000	128,000	128,000	128,000	128,000	128,000
,000	107,000	109,000	111,500	114,000	116,500	119,000	121,500	124,000	126,500	128,000	128,000
,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000
3.10	$ 3.04	$ 2.97	$ 2.92	$ 2.87	$ 2.79	$ 2.73	$ 2.68	$ 2.63	$ 2.57	$ 2.54	$ 2.54
,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$328,980	$340,500
3.10	$ 3.04	$ 2.97	$ 2.92	$ 2.87	$ 2.79	$ 2.73	$ 2.68	$ 2.63	$ 2.57	$ 2.55	$ 2.59
,500	66,000	69,000	72,000	75,000	78,500	82,000	87,000	92,000	97,000	102,500	108,000
,500	+34,000	+31,000	+39,500	+51,000	+62,500	+74,000	+94,000	+115,000	+66,000	+87,000	+108,000
,000	100,000	100,000	111,500	126,000	141,000	156,000	181,000	207,000	163,000	189,500	216,000
,000	140,000	140,000	140,000	140,000	140,000	224,000	224,000	224,000	224,000	224,000	224,000
,000	100,000	100,000	111,500	126,000	141,000	156,000	181,000	207,000	163,000	189,500	224,000
,700	$405,700	$405,700	$495,700	$495,700	$495,700	$675,700	$775,700	$775,700	$775,700	$775,700	$775,700
4.06	$ 4.06	$ 4.06	$ 4.45	$ 3.92	$ 3.54	$ 4.34	$ 4.30	$ 3.76	$ 4.77	$ 4.10	$ 3.60
,000	$268,000	$280,000	$320,000	$294,000	$308,000	$356,000	$374,000	$346,000	$465,000	$423,000	$390,000
4.06	$ 4.06	$ 4.06	$ 4.45	$ 3.92	$ 3.54	$ 4.34	$ 4.30	$ 3.76	$ 4.77	$ 4.10	$ 3.60
,500	648,000	669,000	690,500	712,000	736,000	759,000	781,500	804,500	827,500	851,500	875,000
,300	$2,387,500	$2,320,000	$2,393,500	$2,412,000	$2,479,000	$2,742,000	$2,787,000	$2,837,000	$3,008,000	$2,947,000	$3,074,500
3.87	$ 3.70	$ 3.47	$ 3.47	$ 3.39	$ 3.37	$ 3.61	$ 3.57	$ 3.53	$ 3.64	$ 3.47	$ 3.44
,000	157,000	168,000	179,500	191,000	202,500	214,000	234,000	255,000	276,000	297,000	318,000
500	-34,000	-31,000	-39,500	-51,000	-62,500	-74,000	-94,000	-115,000	- 66,000	-87,000	-108,000
,500	123,000	137,000	140,000	140,000	140,000	140,000	140,000	140,000	210,000	210,000	210,000
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	210,000	210,000	210,000
,500	123,000	137,000	140,000	140,000	140,000	140,000	140,000	140,000	210,000	210,000	210,000
,000	$518,000	$518,000	$518,000	$518,000	$518,000	$518,000	$518,000	$518,000	$760,000	$760,000	$760,000
4.51	$ 4.21	$ 3.78	$ 3.70	$ 3.70	$ 3.70	$ 3.70	$ 3.70	$ 3.70	$ 3.62	$ 3.62	$ 3.62
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
,000	$656,000	$644,000	$694,000	$718,000	$740,000	$839,000	$923,000	$951,000	$1,074,000	$1,116,000	$1,150,000
.31	$ 4.18	$ 3.83	$ 3.85	$ 3.76	$ 3.61	$ 3.90	$ 3.93	$ 3.73	$ 3.88	$ 3.76	$ 3.62
000	322,000	333,000	344,500	356,000	367,500	379,000	402,000	425,000	448,000	471,500	495,000
000	-39,000	-53,000	-56,000	-52,000	-48,000	—	- 6,000	—	—	-18,000	—
000	283,000	280,000	288,500	304,000	319,500	379,000	396,000	425,000	448,000	453,500	495,000
000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000
000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000	113,000
000	$342,000	$342,000	$342,000	$342,000	$342,000	$342,000	$342,000	$342,000	$342,000	$342,000	$342,000
.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04	$ 3.04
000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	256,000
000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	142,000	165,000	170,000	212,000
000	$589,000	$589,000	$589,000	$589,000	$589,000	$589,000	$589,000	$589,000	$589,000	$589,000	$878,000
.46	$ 3.46	$ 3.46	$ 3.46	$ 3.46	$ 3.46	$ 3.46	$ 3.46	$ 4.15	$ 3.56	$ 3.46	$ 4.12
—	—	—	—	—	—	113,000	113,000	170,000	170,000	170,000	170,000
—	—	—	—	—	—	96,000	113,000	170,000	170,000	170,000	170,000
—	—	—	—	—	—	$442,000	$442,000	$631,000	$631,000	$631,000	$631,000
—	—	—	—	—	—	$ 4.62	$ 3.91	$ 3.71	$ 3.71	$ 3.71	$ 3.71
—	—	—	5,000	21,000	36,500	—	—	—	—	—	—
—	—	—	$ 22,500	$ 95,000	$165,000	—	—	—	—	—	—
200	$1,071,000	$1,109,000	$1,135,000	$1,196,000	$1,243,000	$1,373,000	$1,395,000	$1,562,000	$1,562,000	$1,622,000	$1,851,000
.55	$ 3.34	$ 3.29	$ 3.29	$ 3.36	$ 3.39	$ 3.62	$ 3.40	$ 3.69	$ 3.48	$ 3.44	$ 3.74
000	$1,182,500	$1,228,000	$1,275,000	$1,322,000	$1,372,000	$1,421,000	$1,489,500	$1,560,000	$1,630,000	$1,702,500	$1,774,000
300	$4,404,500	$4,349,000	$4,540,500	$4,604,000	$4,721,000	$5,225,000	$5,388,000	$5,637,000	$5,954,000	$6,009,000	$6,413,500
88	$ 3.72	$ 3.55	$ 3.55	$ 3.48	$ 3.44	$ 3.67	$ 3.63	$ 3.63	$ 3.66	$ 3.53	$ 3.62

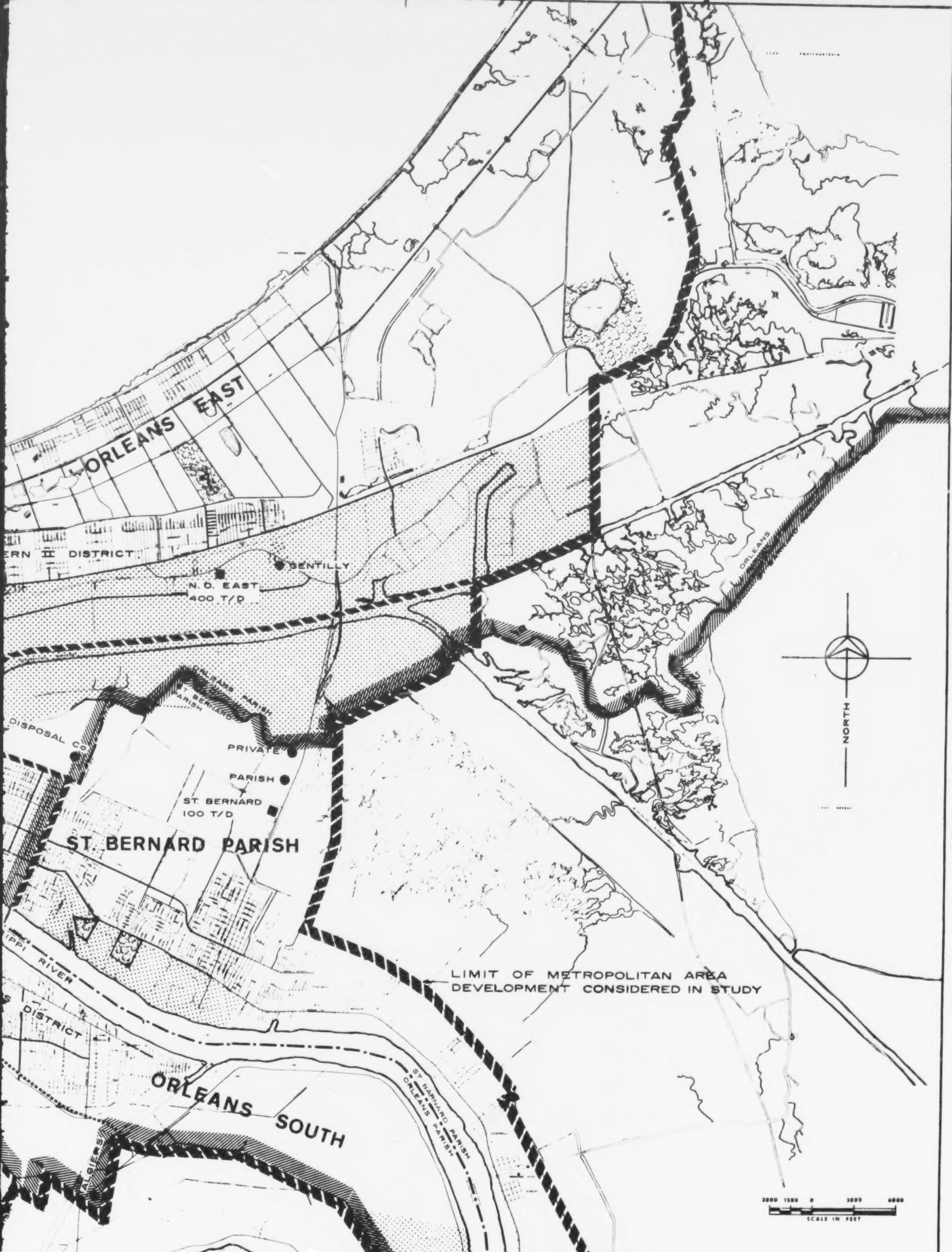
F

A


LEGEND
▨ INDUSTRIAL AREA
■ INCINERATORS
● LAND FILLS
● ST. CHARLES LAND FILL APPROX. 7 MI. WEST OF CITY OF KENNER.
LAKE PONTCHARTRAIN
KENNER
JEFFERSON PARISH
EAST BANK
KENNER
DAVID DR
400 T/D
ORLEANS
CEN
WESTERN DISTRICT
MON. WED.
MON. WED. & FRI.
ST LOUIS
450 T/D
TUES THUR & SAT
NIGHT DISTRICT
NEW ORLEANS
7th ST
400 T/D
DISTRICT
CENTRAL
TUES, THUR, & SAT
MON, WED, & FRI
ORLEANS PARISH
JEFFERSON PARISH
JEFFERSON PARISH
ORLEANS PARISH
MISSISSIPPI RIVER
HARAHAN
WESTWEGO
PARISH
PARISH
WESTWEGO
JEFFERSON PARISH
WEST BANK
MARRERO
100 T/D

D


AREA
ORLEANS EAST
EASTERN II DISTRICT
TUES, THUR & SAT
MON, WED, & FRI
N. O. EAST
400 T/D
GENTILLY
FLA. AVE.
400 T/D
MON, WED, & FRI
N. O. DISPOSAL CO.
CENTRAL
EASTERN I DISTRICT
TUES, THUR & SAT
PRIVATE
PARISH
ST. BERNARD
100 T/D
ST. BERNARD PARISH
ORLEANS PARISH
ST. BERNARD PARISH
OUIS
0 T/D
TUES, THUR & SAT
NIGHTLY
NIGHT DISTRICT
MON, WED, & FRI
RICT
WED, & FRI
MISSISSIPPI RIVER
TUES, THUR & SAT
ALGIERS DISTRICT
MON, WED, & FRI
ALGIERS
200 T/D
GRETNA
PARISH
PARISH
GRETNA
100 T/D
CITY LIMITS
GRETNA
SH
ALGIERS
ORLEANS SOUTH
ST. BERNARD PARISH
ORLEANS PARISH
LIMIT OF METROPOLITAN AR
DEVELOPMENT CONSIDERED IN
EXIS
COLL
DISPO
TRI


ORLEANS EAST
ERN II DISTRICT
GENTILLY
N.O. EAST
400 T/D
ORLEANS PARISH
ST. BERNARD PARISH
DISPOSAL CO.
PRIVATE
PARISH
ST. BERNARD
100 T/D
ST. BERNARD PARISH
PPI RIVER
S DISTRICT
ORLEANS SOUTH
ALGIERS
ST. BERNARD PARISH
ORLEANS PARISH
ORLEANS
LIMIT OF METROPOLITAN AREA
DEVELOPMENT CONSIDERED IN STUDY
NORTH
3000 1500 0 3000 6000
SCALE IN FEET

EXISTING
COLLECTION DISTRICTS &
DISPOSAL FACILITIES

TRI PARISH AREA

FIG. 1-1

C

A

LEGEND

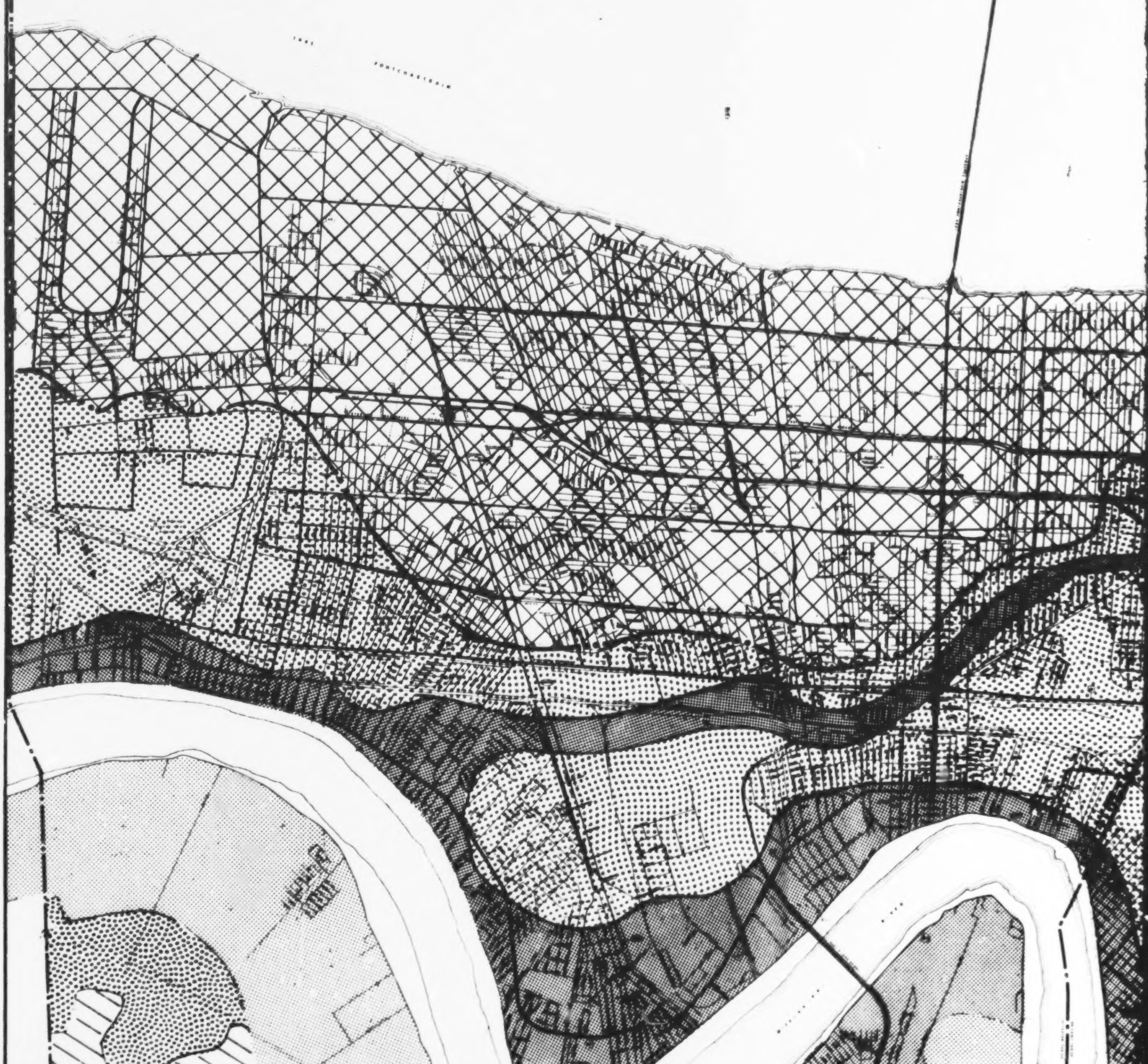
░ **COMMERCE-MHOON-SHARKEY SOILS**
Very fine sandy loam to clay textured, neutral to alkaline, moderately to very slowly permeable, imperfectly to poorly drained soils of recent Mississippi River origin.

■ **SHARKEY SOILS-SWAMP LAND**
Clays, mucky clays and peat soils of recent Mississippi River origin that are either periodically flooded or remain under water most of the year.

▒ **SHARKEY SOILS-SWAMP LAND, DRAINED**
Clays, mucky clays and peat soils of recent Mississippi River origin that are protected by levees and drained by pumps.

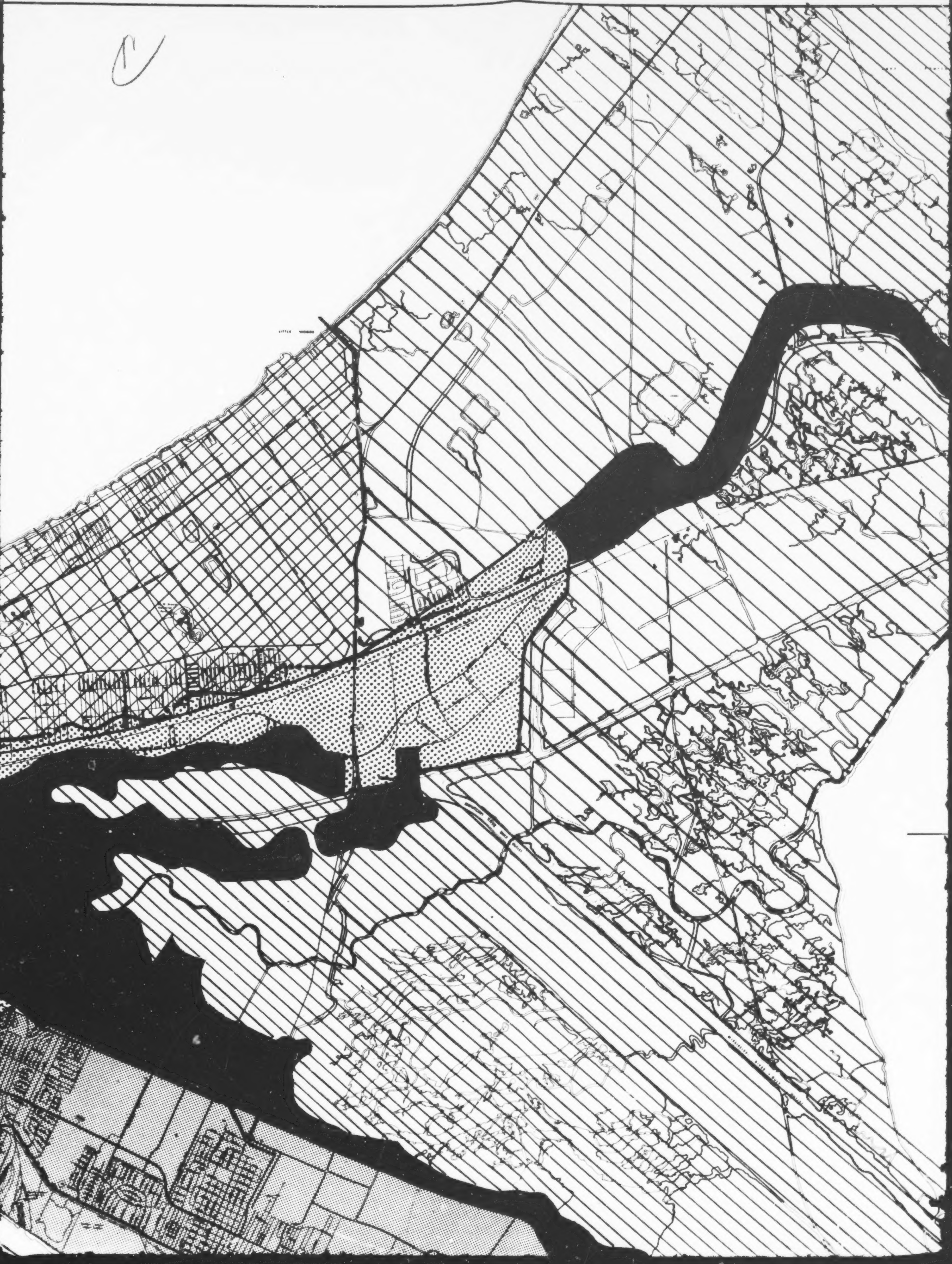
▧ **SALT WATER MARSHLAND**
Peat, muck and clay soils dominantly of recent Mississippi River origin that are flooded most of the year and support salt water marsh vegetation. They vary from stable to very unstable for livestock grazing.

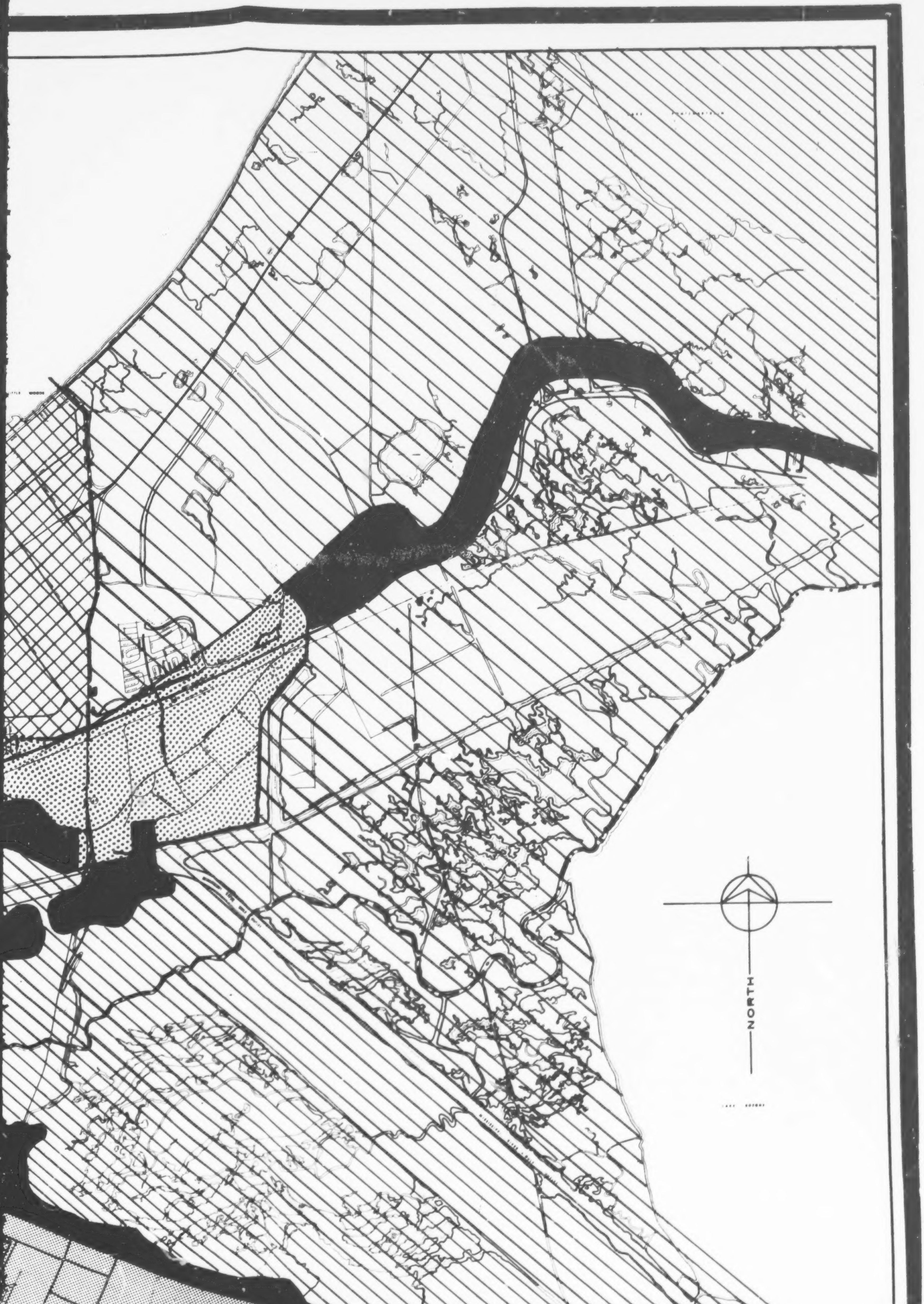
▩ **MARSHLANDS, DRAINED**
Peat, muck and clay, fresh and salt water marshland soils, dominantly of recent Mississippi River origin, protected by levees and drained by pumps; some areas high in sulphides.

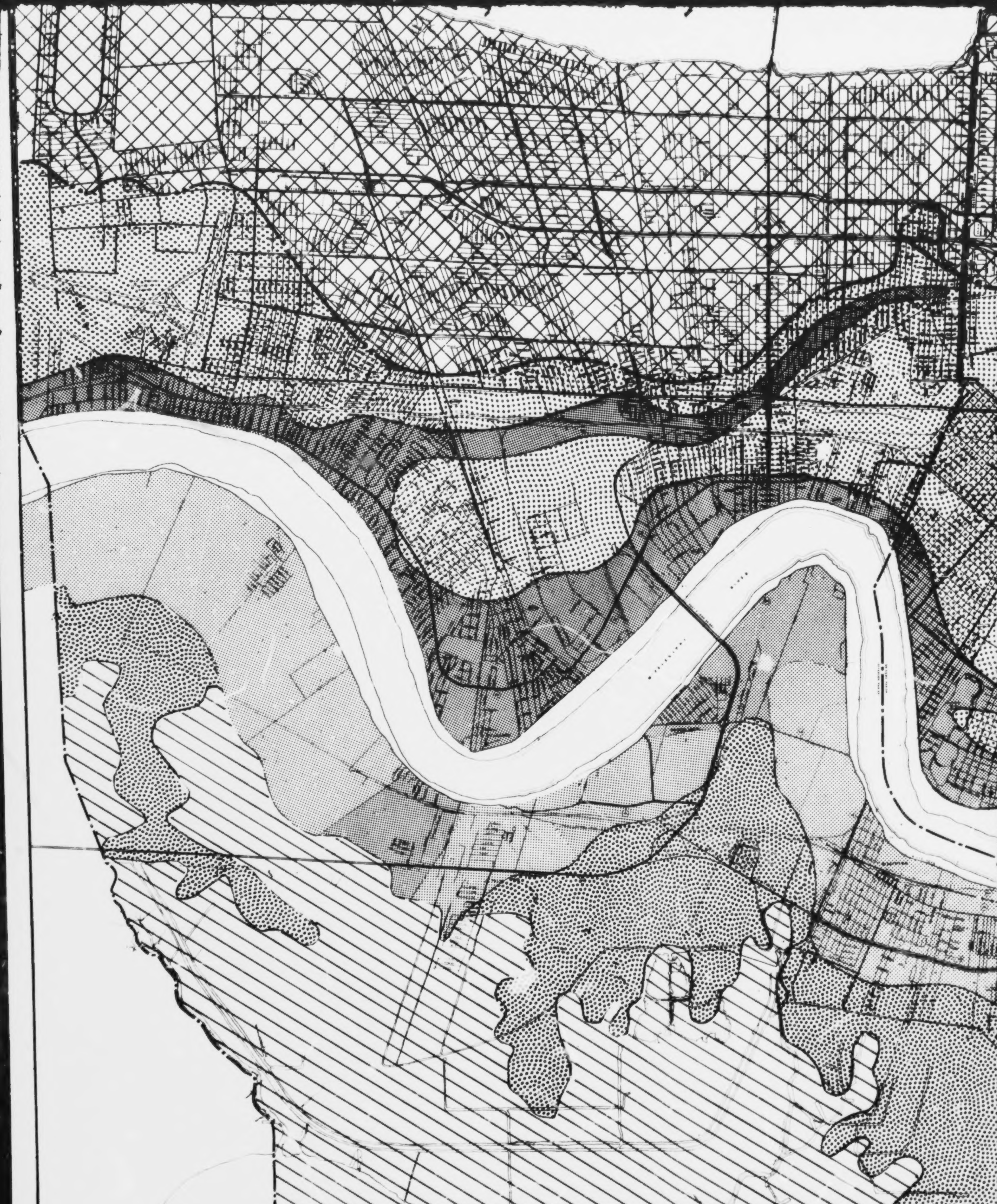


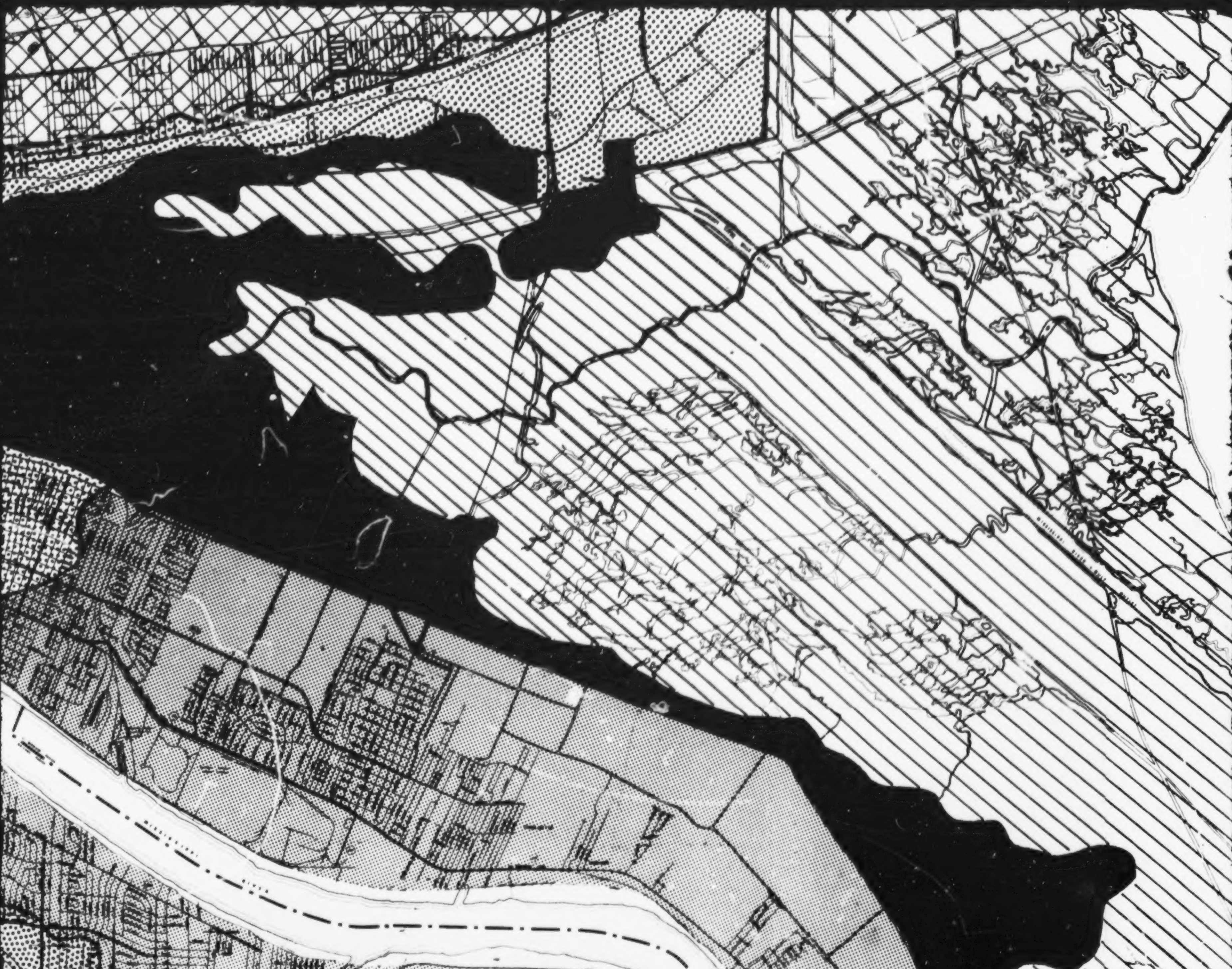
B

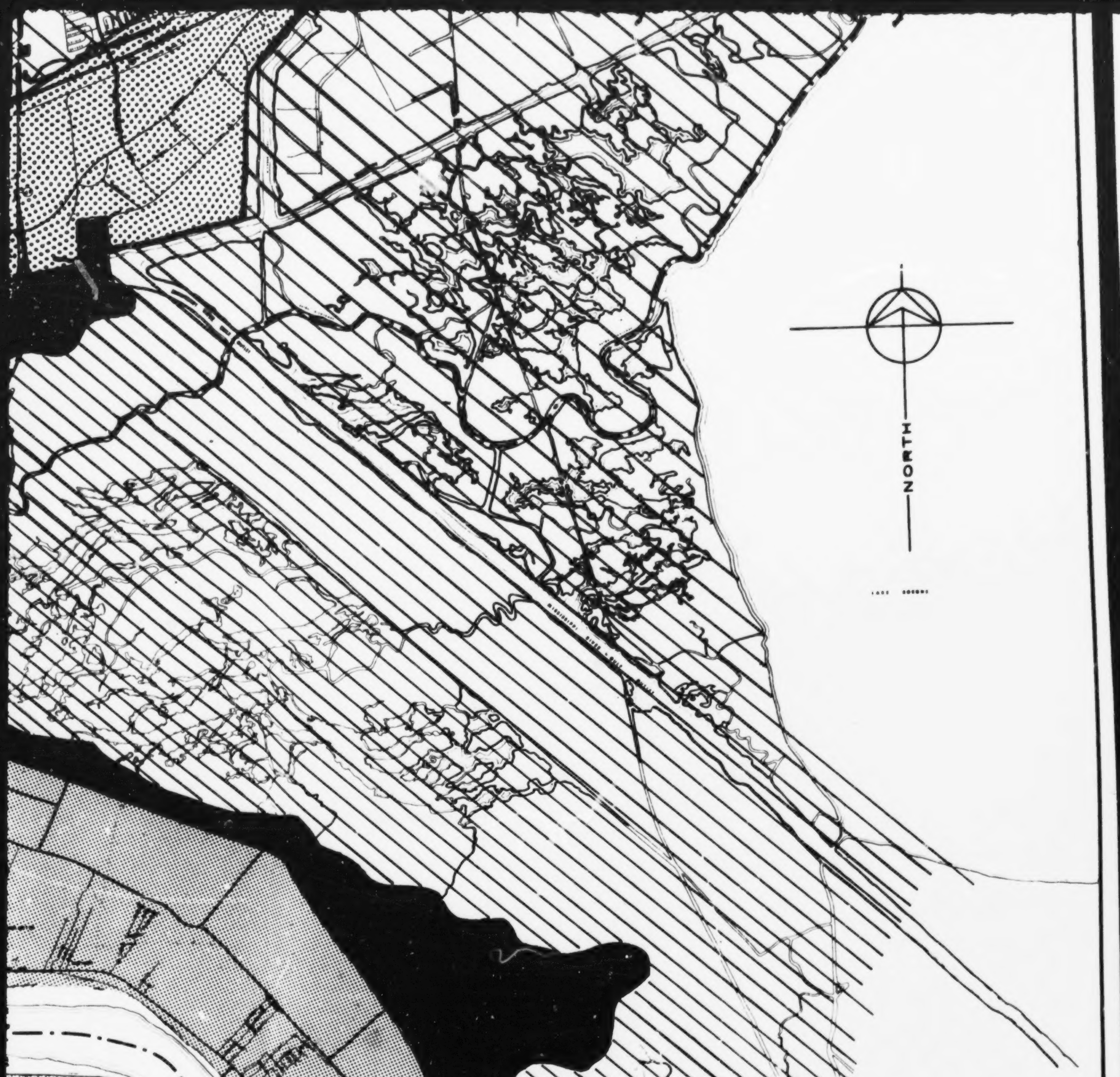
LAKE PONTCHARTRAIN


LITTLE WOODS


NORTH






NORTH
3000 1500 0 3000 6000
SCALE IN FEET

GENERAL SOILS CLASSIFICATION

JEFFERSON, ORLEANS & ST. BERNARD PARISHES

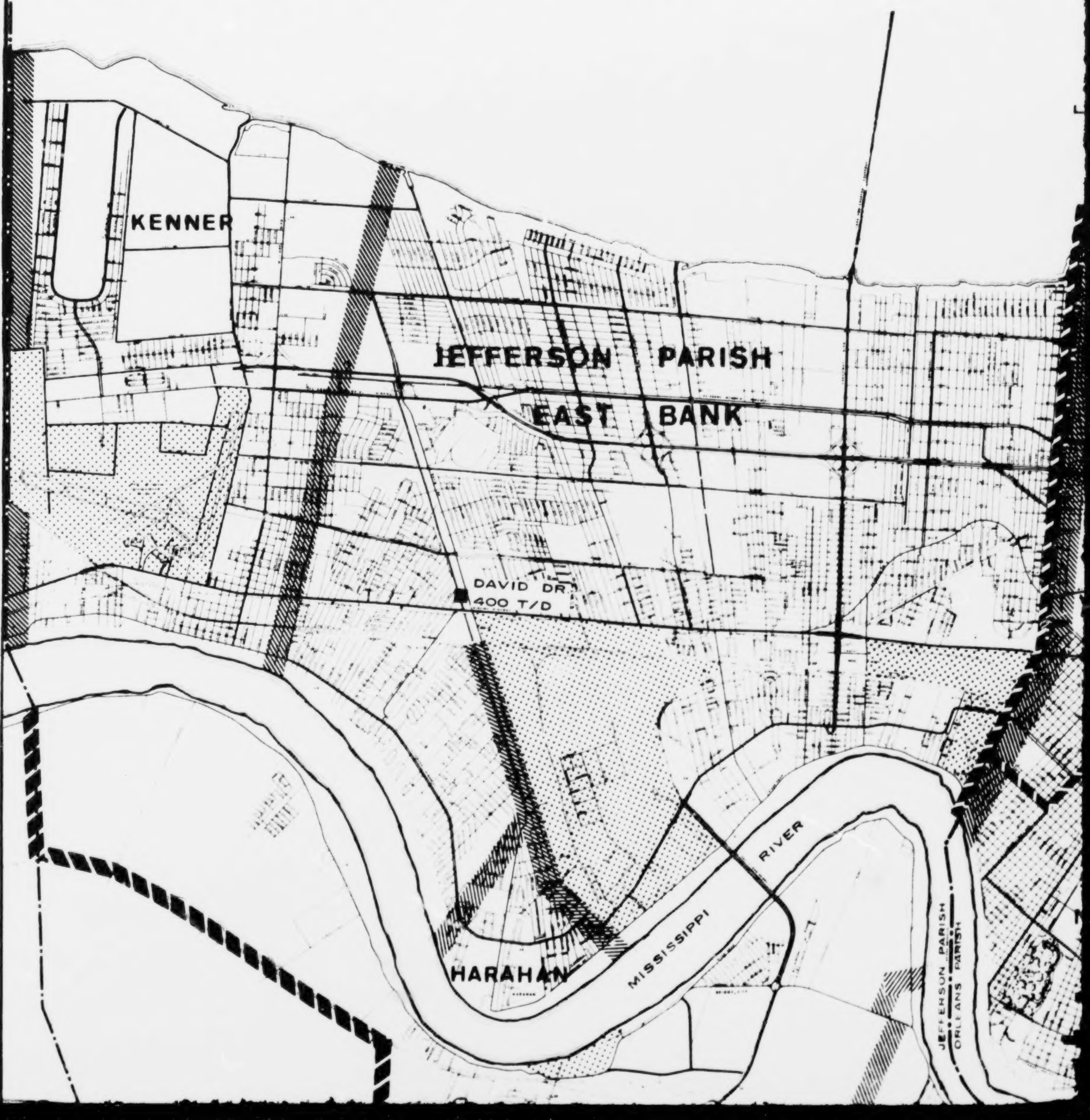
U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

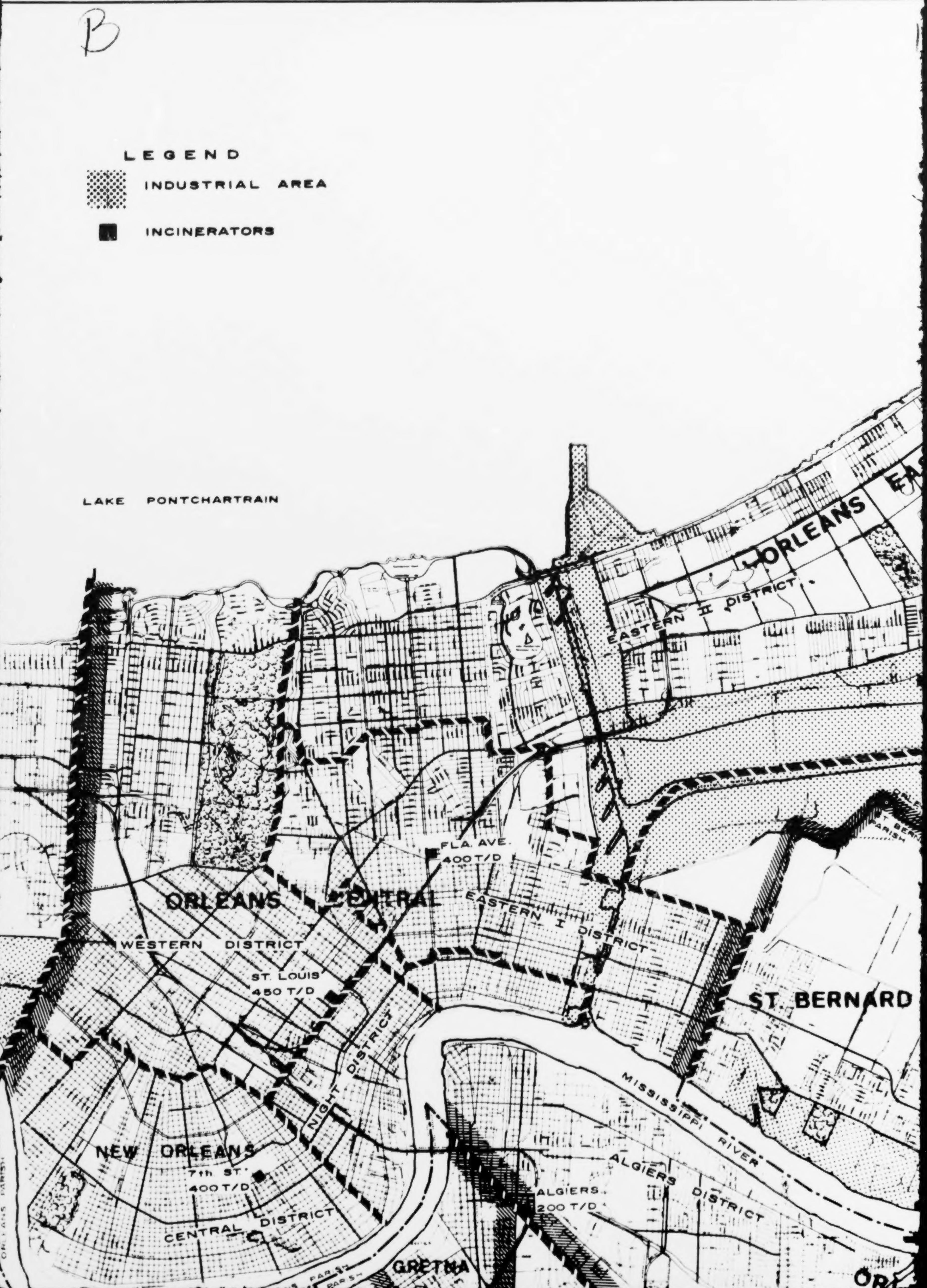
FIG. IV-2

H

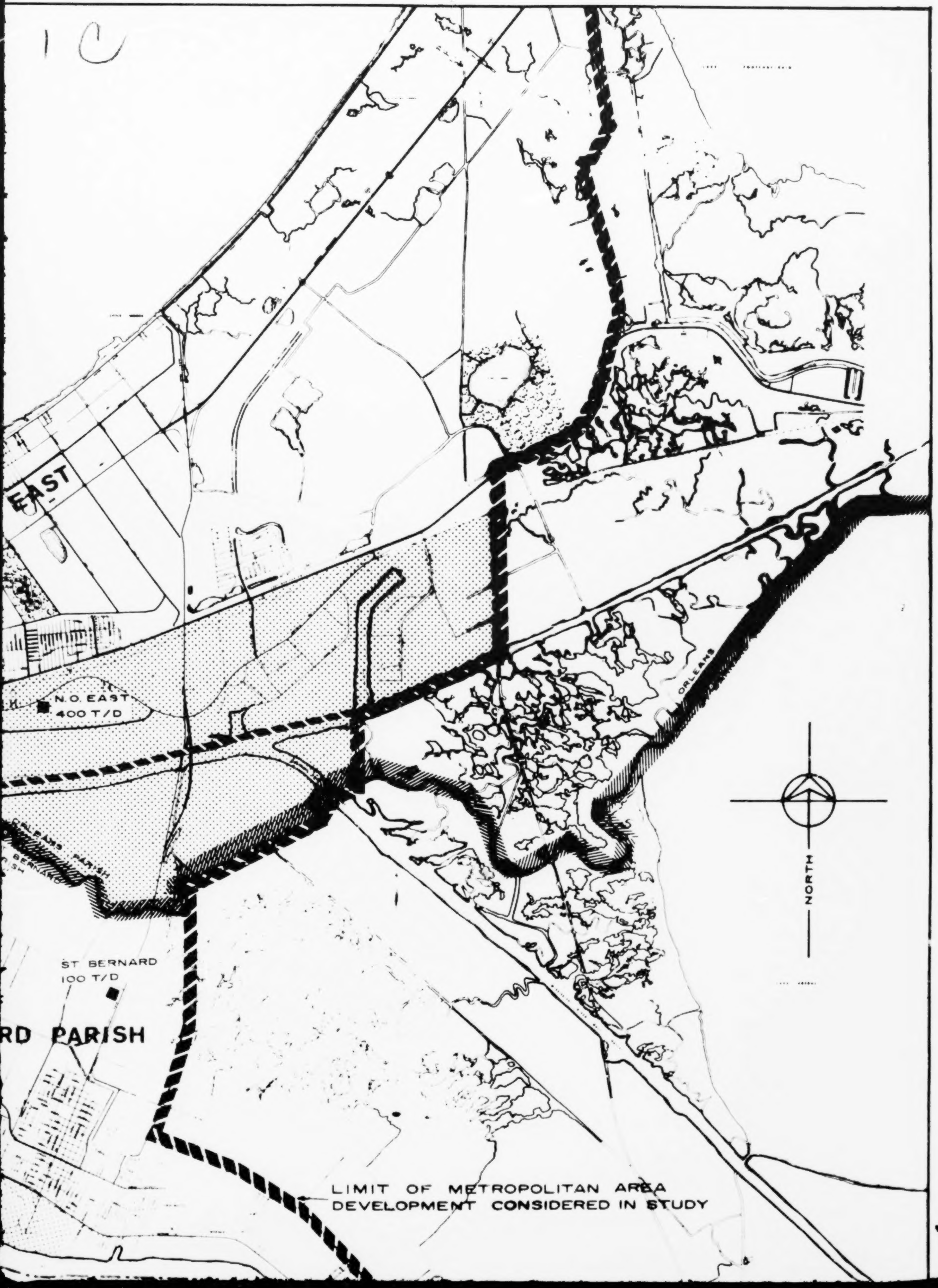
A

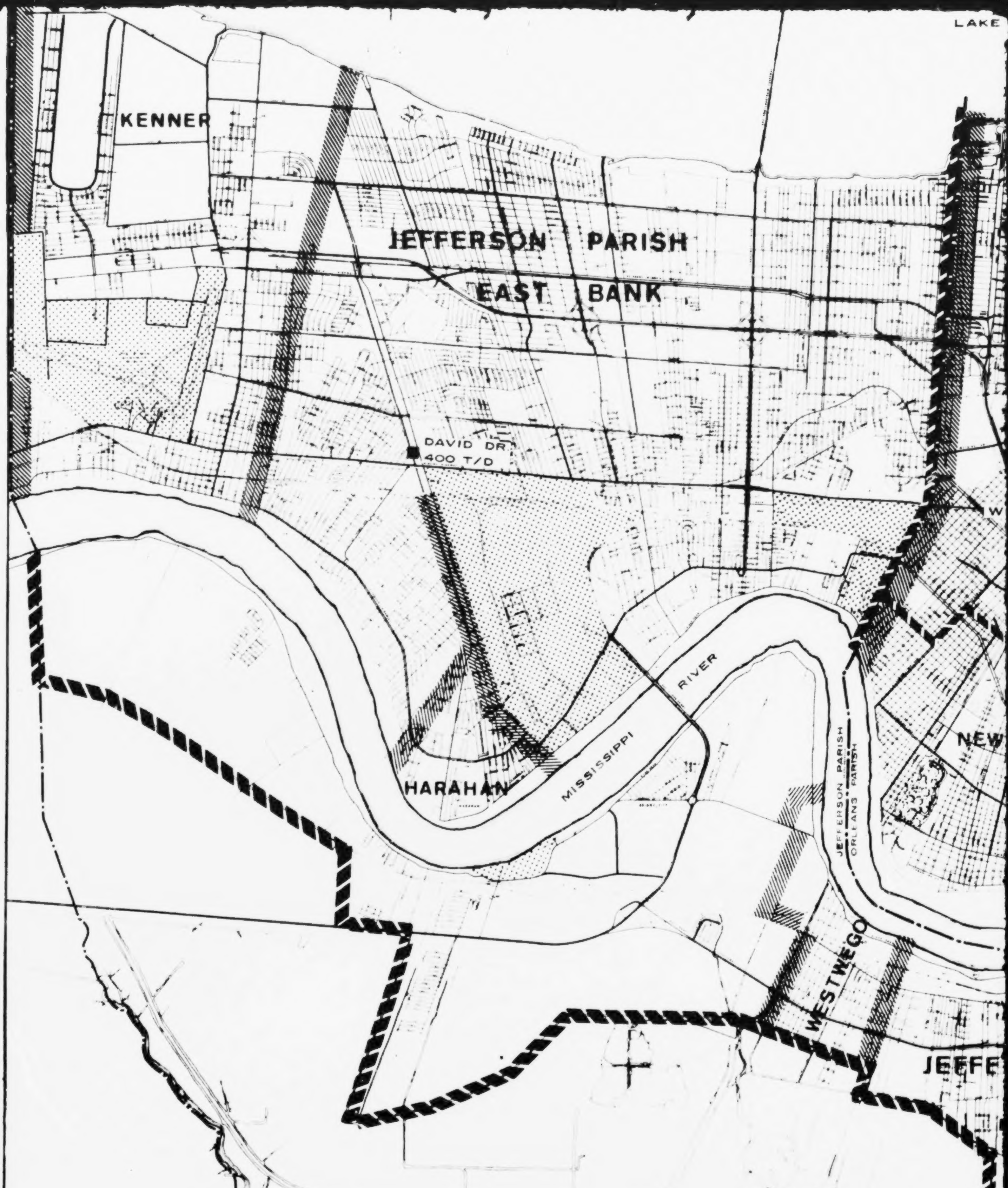

KENNER
JEFFERSON PARISH
EAST BANK
DAVID DR
400 T/D
HARAHAN
MISSISSIPPI RIVER
JEFFERSON PARISH
ORLEANS PARISH

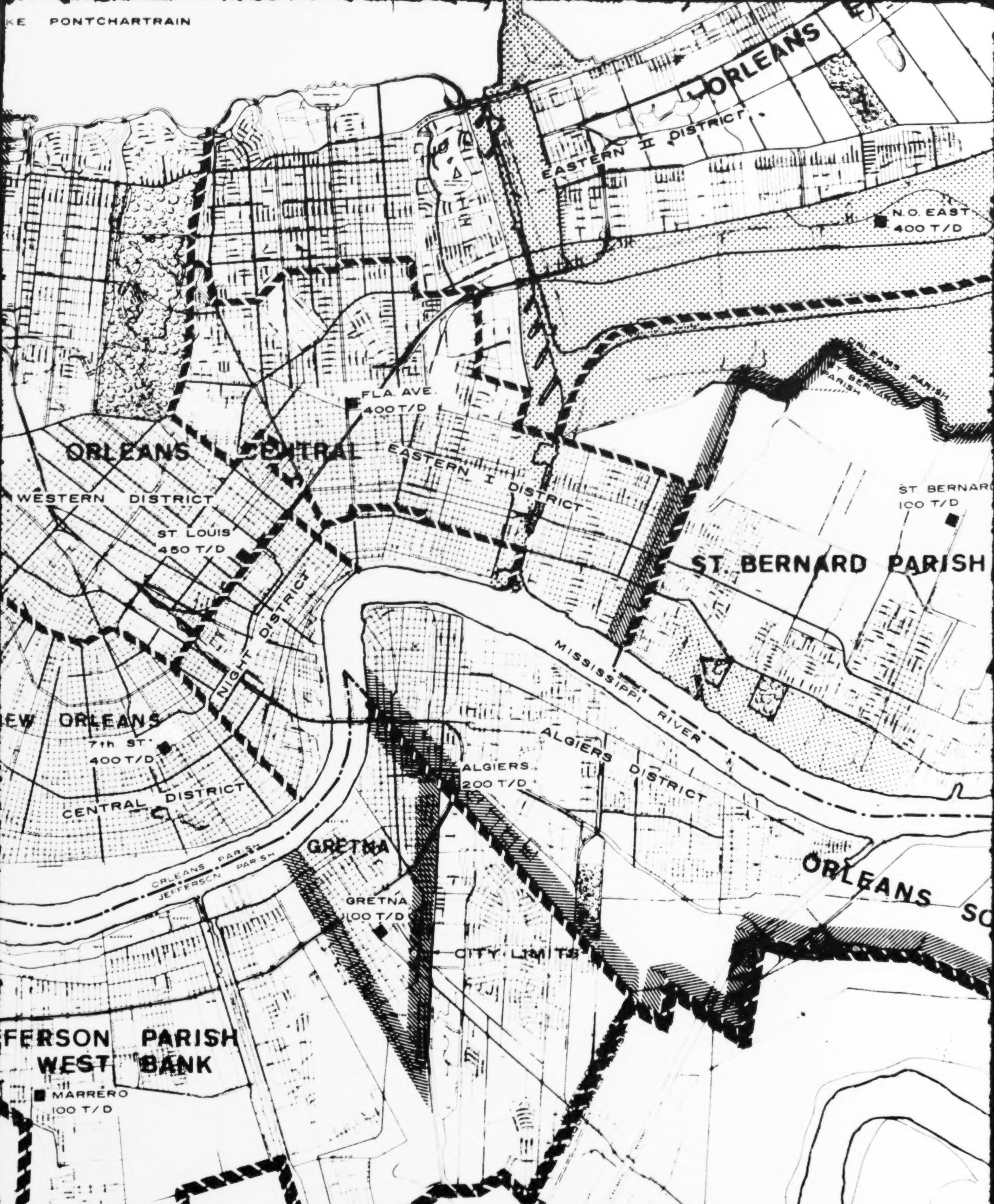
B

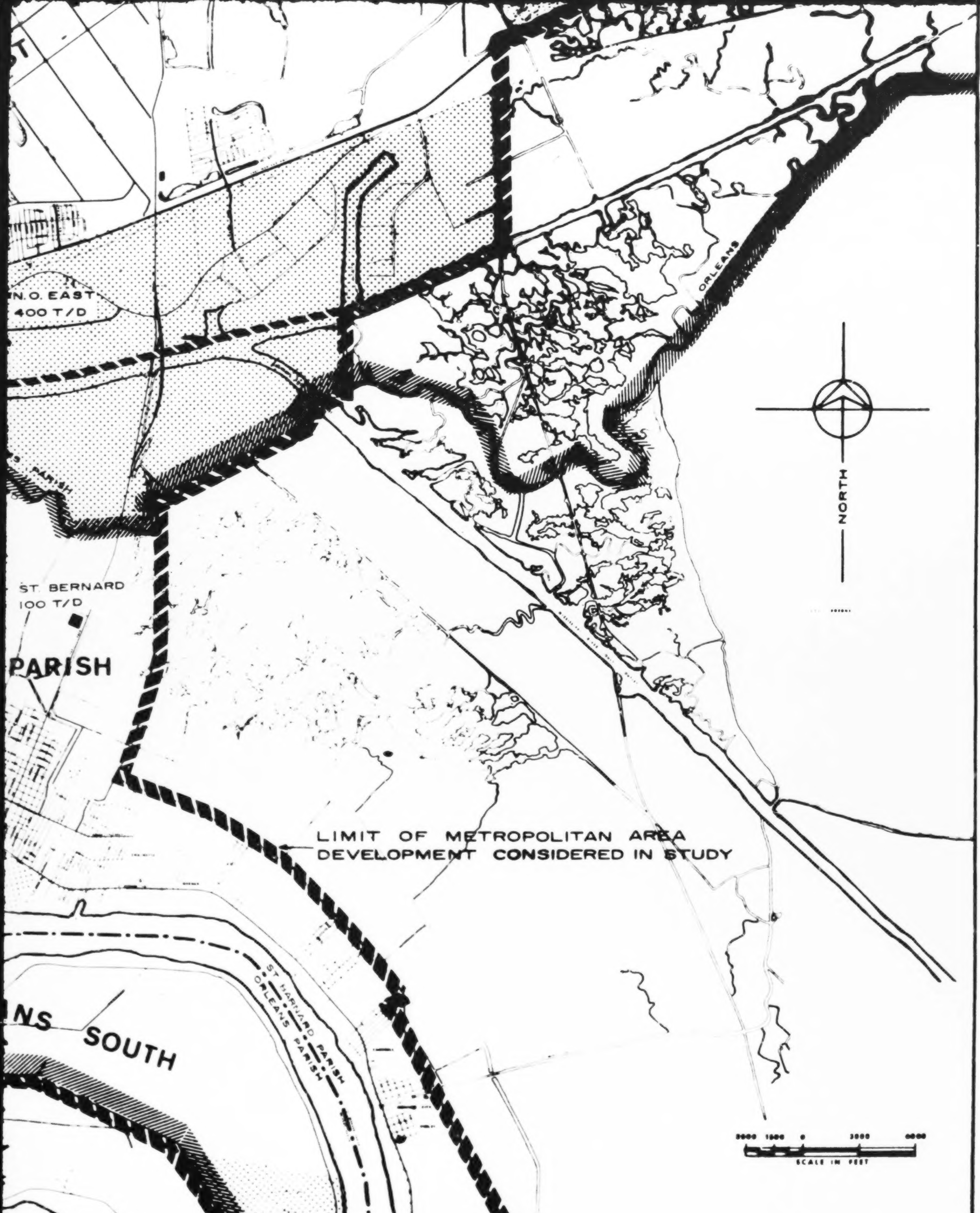

LEGEND
▨ INDUSTRIAL AREA
■ INCINERATORS
LAKE PONTCHARTRAIN
ORLEANS EA
EASTERN II DISTRICT
FLA. AVE. 400 T/D
ORLEANS CENTRAL
EASTERN I DISTRICT
WESTERN DISTRICT
ST. LOUIS 450 T/D
NIGHT DISTRICT
ST. BERNARD
ST. BER PARISH
MISSISSIPPI RIVER
NEW ORLEANS
7th ST. 400 T/D
CENTRAL DISTRICT
ALGIERS 200 T/D
ALGIERS DISTRICT
GRETNA
ORLEANS PARISH
PAR. S.
OR

1 C


EAST
H.
N.O. EAST
400 T/D
ORLEANS PARISH
BERNARD
ISH
ORLEANS
NORTH
ST BERNARD
100 T/D
RD PARISH
LIMIT OF METROPOLITAN AREA
DEVELOPMENT CONSIDERED IN STUDY


LAKE
KENNER
JEFFERSON PARISH
EAST BANK
DAVID DR.
400 T/D
W
NEW
HARAHAN
MISSISSIPPI RIVER
JEFFERSON PARISH
ORLEANS PARISH
WESTWEGO
JEFFE
D

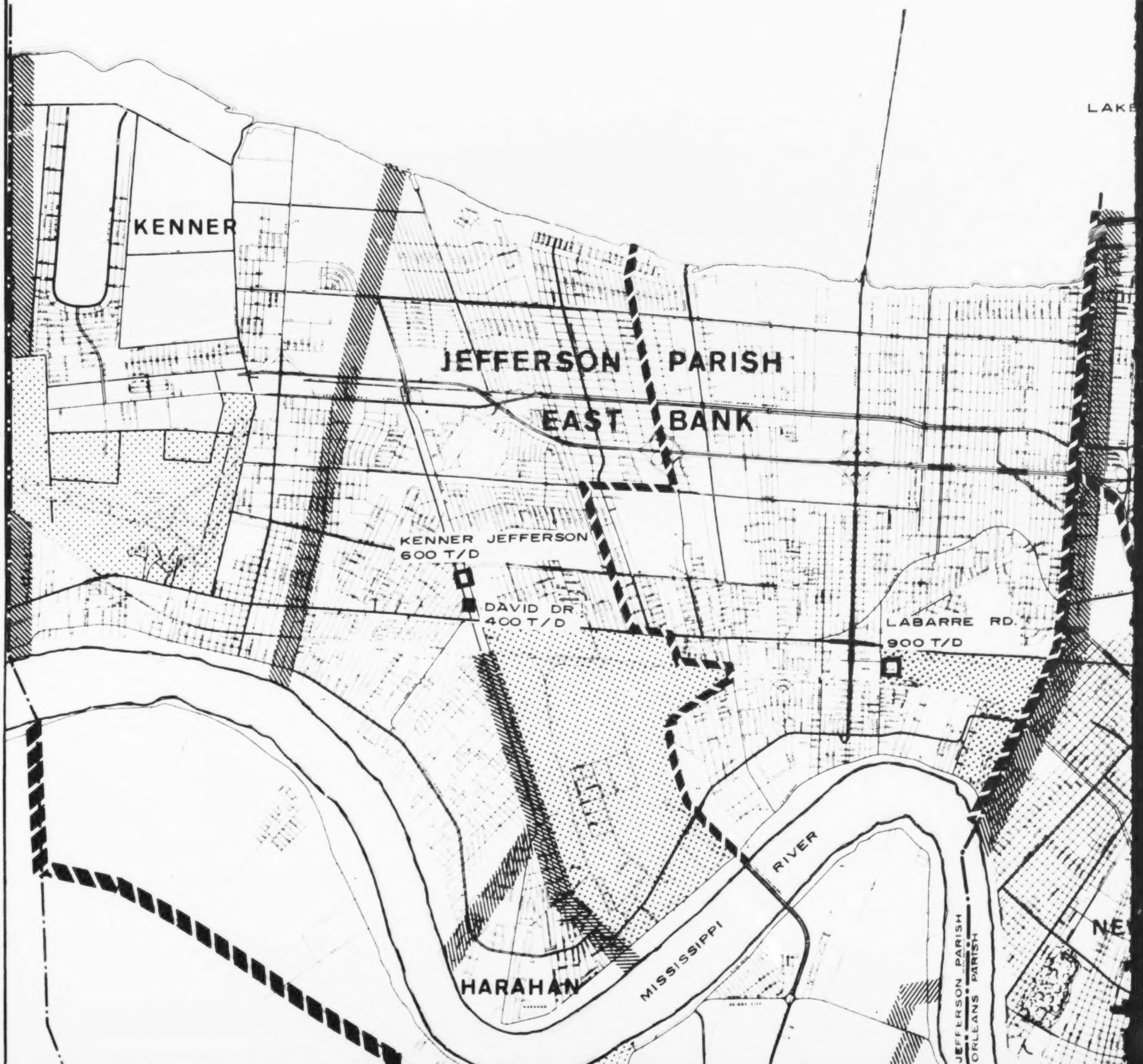

KE PONTCHARTRAIN
ORLEANS
EASTERN II DISTRICT
N.O. EAST
400 T/D
ORLEANS PARISH
ST. BERNARD PARISH
FLA. AVE.
400 T/D
ORLEANS CENTRAL
EASTERN I DISTRICT
WESTERN DISTRICT
ST. LOUIS
450 T/D
ST. BERNARD
100 T/D
ST. BERNARD PARISH
NIGHT DISTRICT
MISSISSIPPI RIVER
EW ORLEANS
7th ST.
400 T/D
ALGIERS DISTRICT
ALGIERS
200 T/D
CENTRAL DISTRICT
GRETNA
ORLEANS PARISH
JEFFERSON PARISH
ORLEANS SO
GRETNA
100 T/D
CITY LIMITS
EFFERSON PARISH
WEST BANK
MARRERO
100 T/D


N.O. EAST
400 T/D
S PARISH
ORLEANS
NORTH
ST. BERNARD
100 T/D
PARISH
LIMIT OF METROPOLITAN AREA
DEVELOPMENT CONSIDERED IN STUDY
ST BERNARD PARISH
ORLEANS PARISH
NS SOUTH
SCALE IN FEET

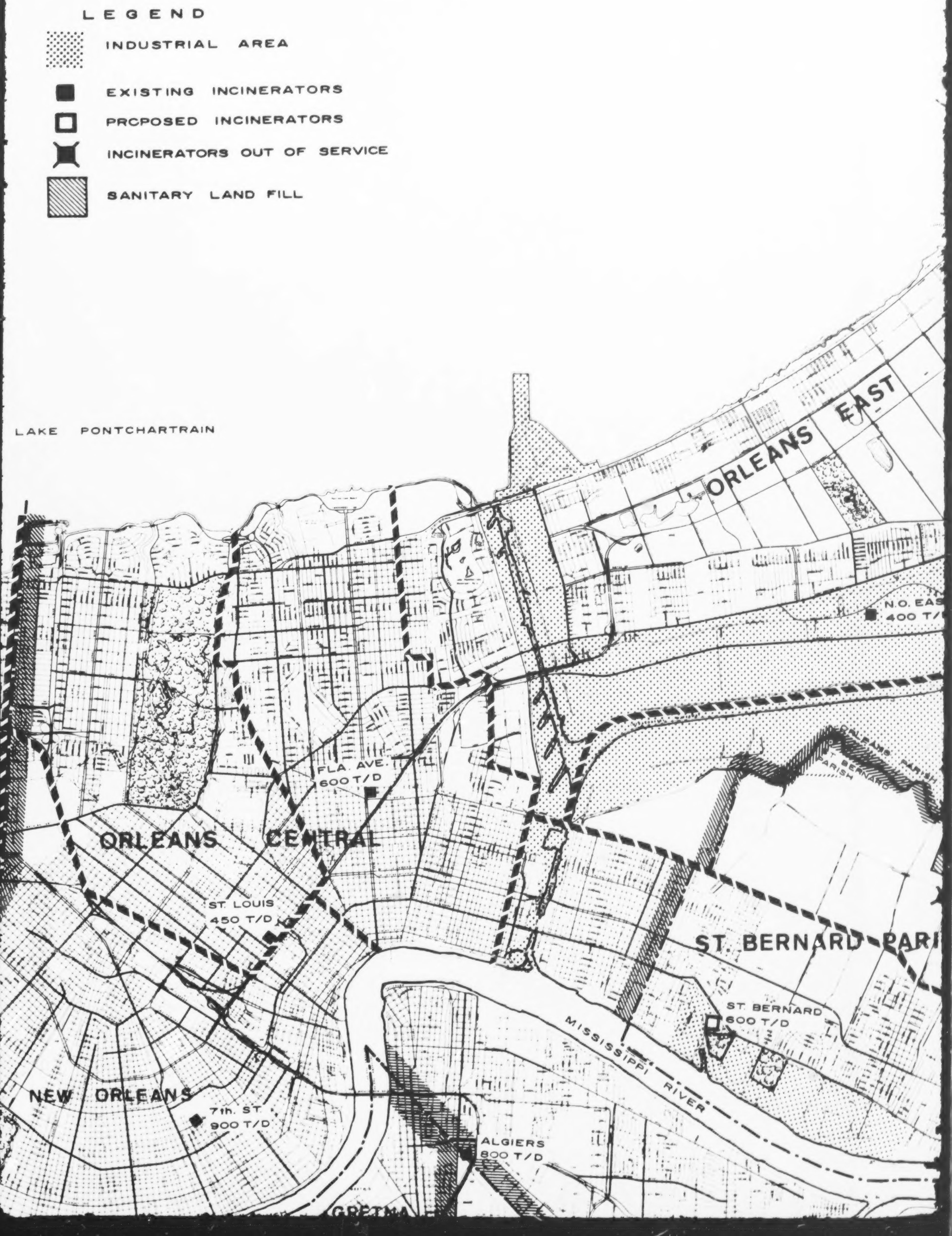
REVISED
COLLECTION DISTRICTS
CITY OF NEW ORLEANS

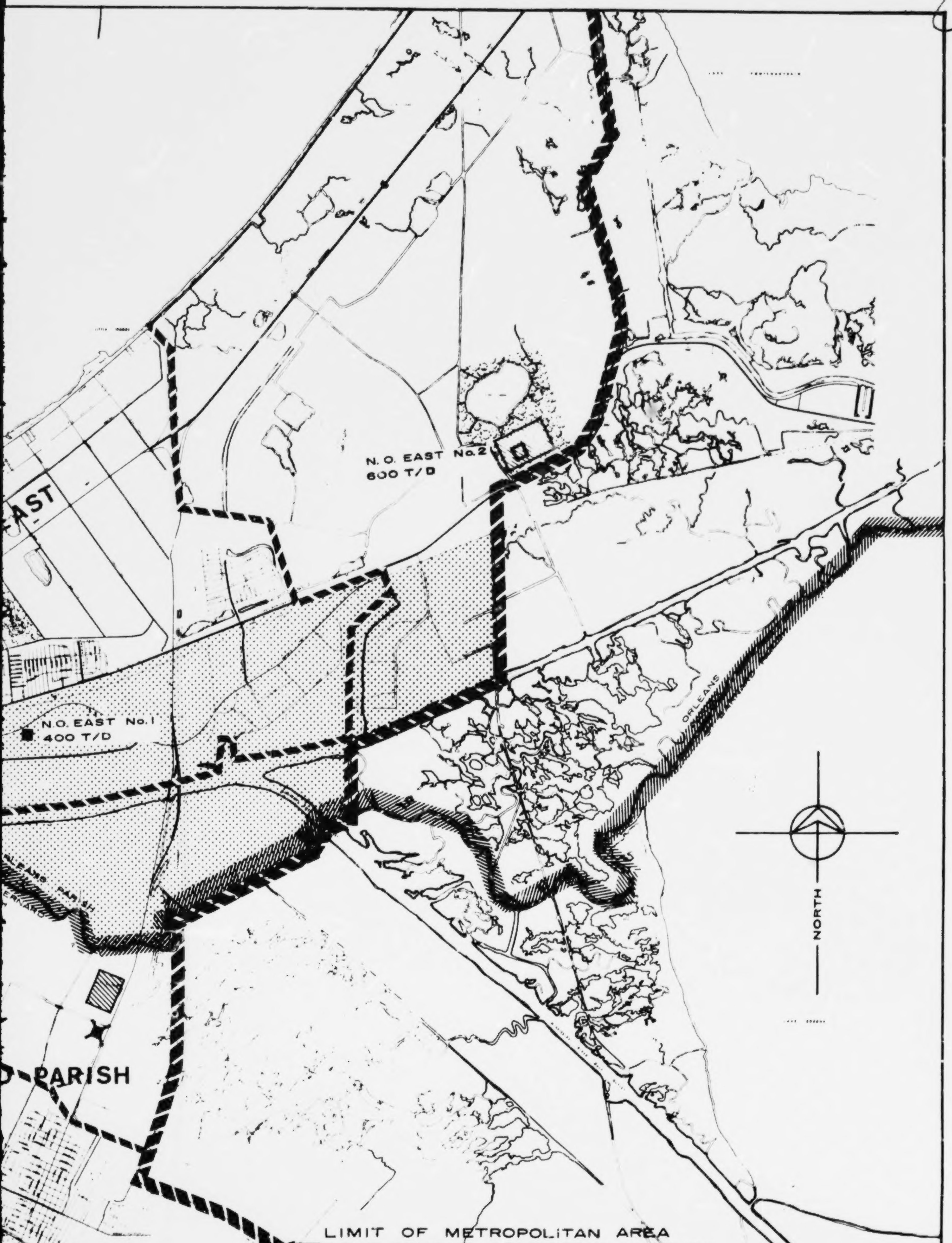
FIG. V-8

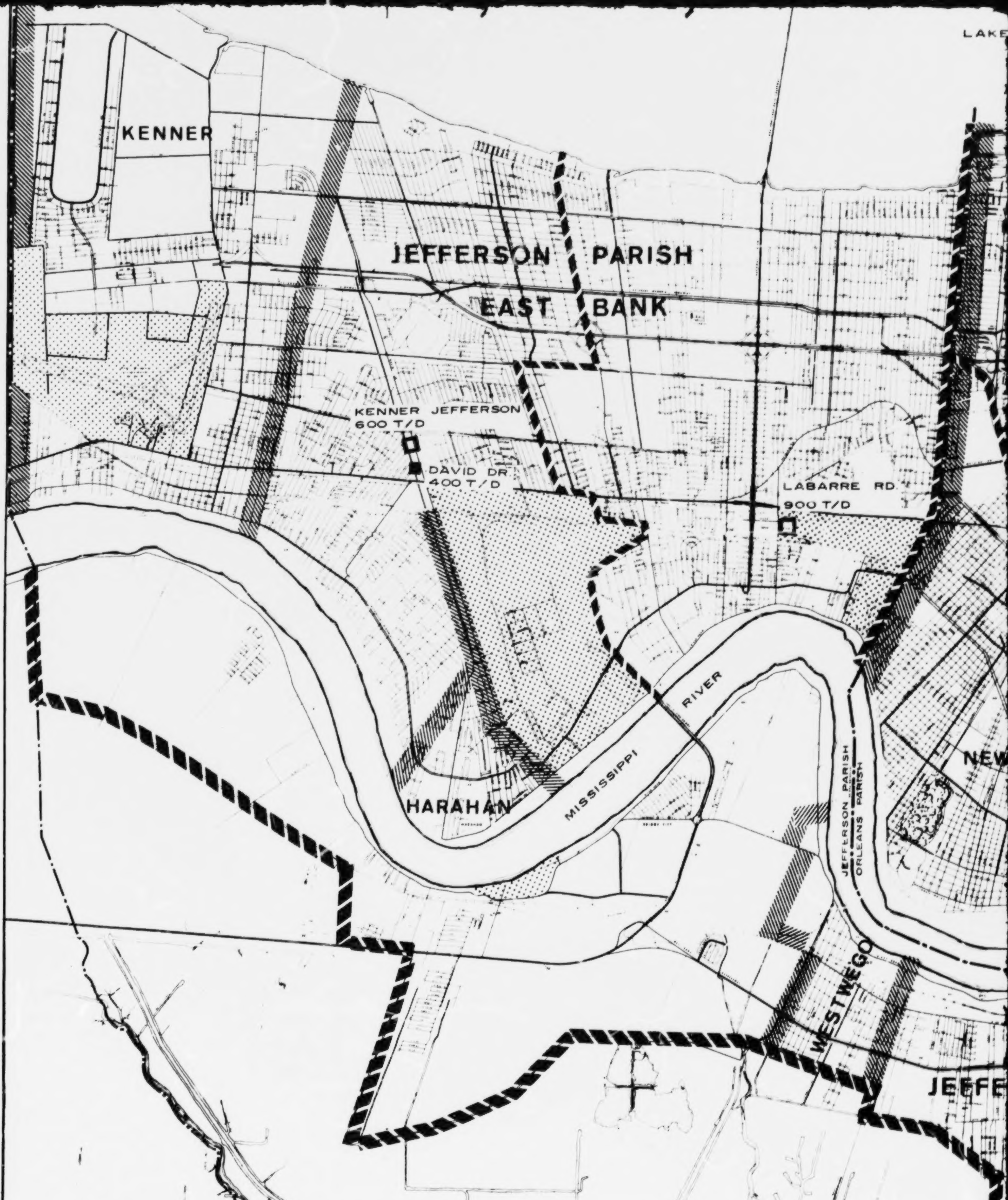
A


LAKE
KENNER
JEFFERSON PARISH
EAST BANK
KENNER JEFFERSON
600 T/D
DAVID DR
400 T/D
LABARRE RD.
900 T/D
HARAHAN
MISSISSIPPI RIVER
JEFFERSON PARISH
ORLEANS PARISH
NE

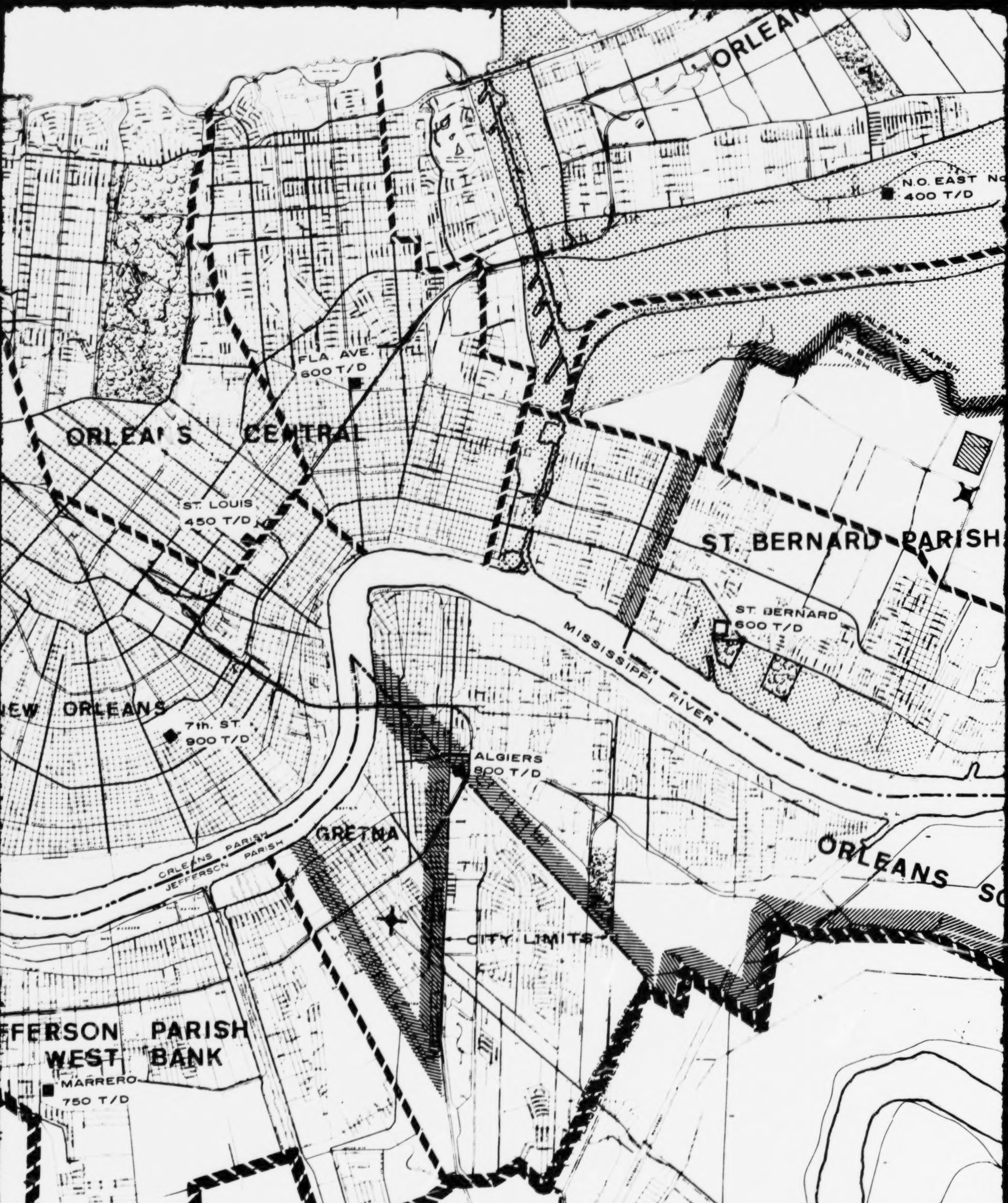
B

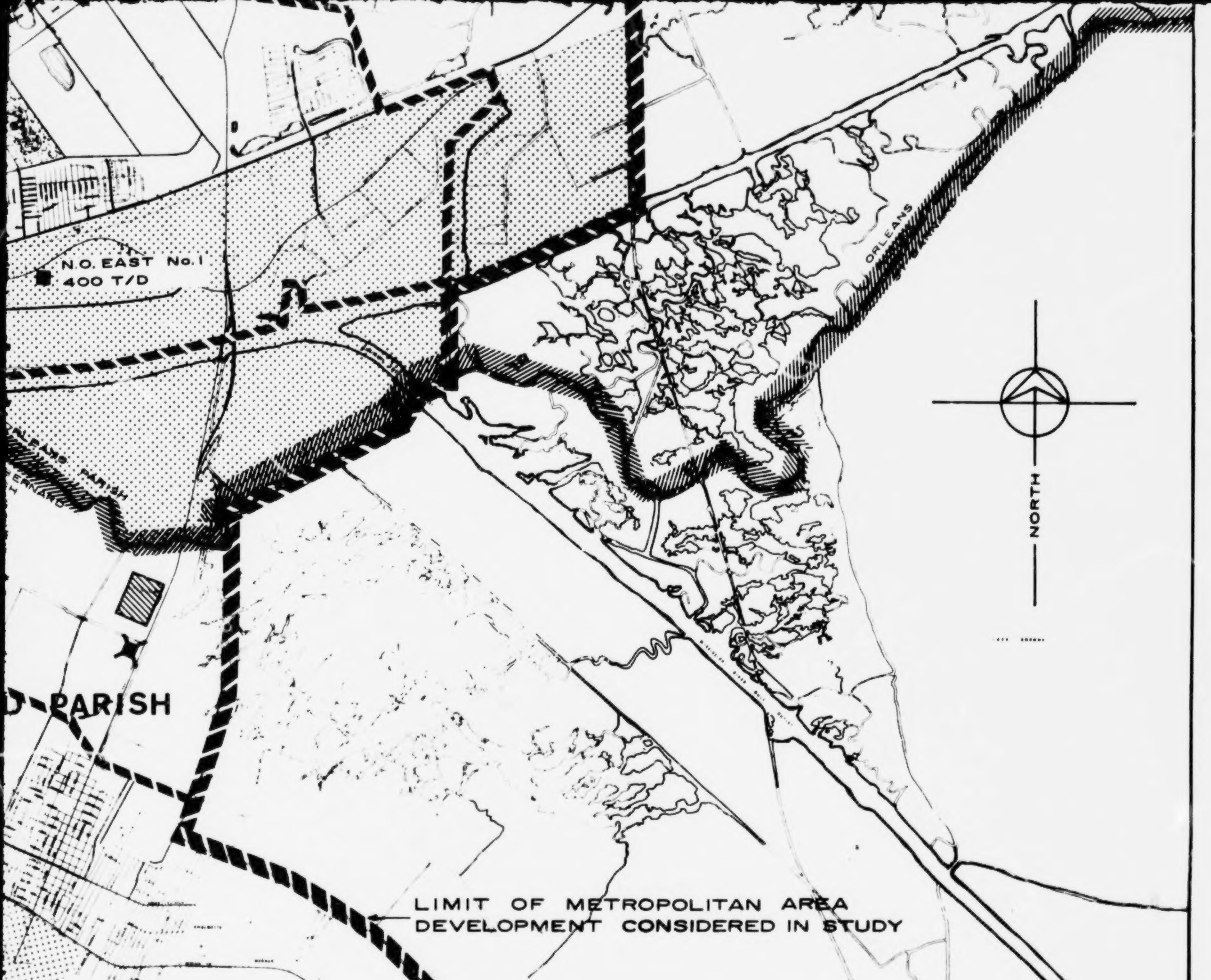

LEGEND
INDUSTRIAL AREA
EXISTING INCINERATORS
PROPOSED INCINERATORS
INCINERATORS OUT OF SERVICE
SANITARY LAND FILL
LAKE PONTCHARTRAIN
ORLEANS EAST
N.O. EAS
400 T/
FLA. AVE.
600 T/D
ORLEANS PARISH
ST. BERNARD PARISH
ORLEANS CENTRAL
ST. LOUIS
450 T/D
ST. BERNARD PARI
ST. BERNARD
600 T/D
MISSISSIPPI RIVER
NEW ORLEANS
7th. ST.
900 T/D
ALGIERS
800 T/D
GRETNA


EAST
N.O. EAST No.2
600 T/D
N.O. EAST No.1
400 T/D
ORLEANS
NORTH
PARISH
LIMIT OF METROPOLITAN AREA
DEVELOPMENT CONSIDERED IN STUDY


LAKE
KENNER
JEFFERSON PARISH
EAST BANK
KENNER JEFFERSON
600 T/D
DAVID DR
400 T/D
LABARRE RD.
900 T/D
MISSISSIPPI RIVER
HARAHAN
JEFFERSON PARISH
ORLEANS PARISH
NEW
WESTWEGO
JEFFE

D


ORLEANS
ORLEANS
N.O. EAST NO
400 T/D
FLA. AVE.
600 T/D
ORLEANS PARISH
ST. BERNARD PARISH
ORLEANS CENTRAL
ST. LOUIS
450 T/D
ST. BERNARD PARISH
ST. BERNARD
600 T/D
MISSISSIPPI RIVER
NEW ORLEANS
7th. ST.
900 T/D
ALGIERS
800 T/D
GRETNA
ORLEANS PARISH
JEFFERSON PARISH
ORLEANS SO
CITY LIMITS
JEFFERSON PARISH
WEST BANK
MARRERO
750 T/D


N.O. EAST No. 1
400 T/D
ORLEANS
NORTH
ORLEANS PARISH
D PARISH
LIMIT OF METROPOLITAN AREA DEVELOPMENT CONSIDERED IN STUDY
ST BARNARD PARISH
ORLEANS PARISH
EANS SOUTH
3000 1500 0 3000 6000
SCALE IN FEET

FUTURE
COLLECTION DISTRICTS &
DISPOSAL FACILITIES

TRI PARISH AREA

FIG. V-13

F